ARCHITECTURE

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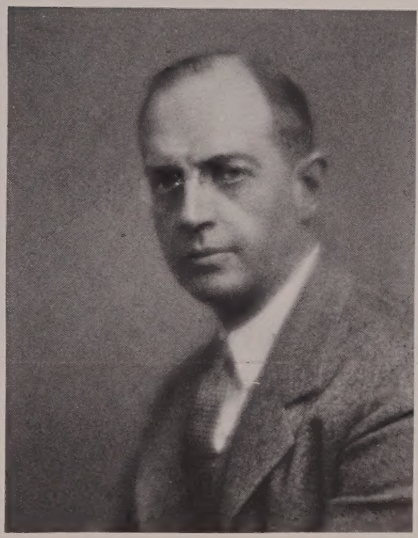
Reginald D. Johnson

By Henry H. Saylor

IN almost any group of architects, taken at random, it is easy to start an argument upon which is the more important side of an architect's practice—design or business. You will hear that the highest type of designer never is and never can be a business man. On the other hand, you will hear that the impractical dreamer, who does not make of architecture a business, cannot succeed, and does not deserve to succeed.

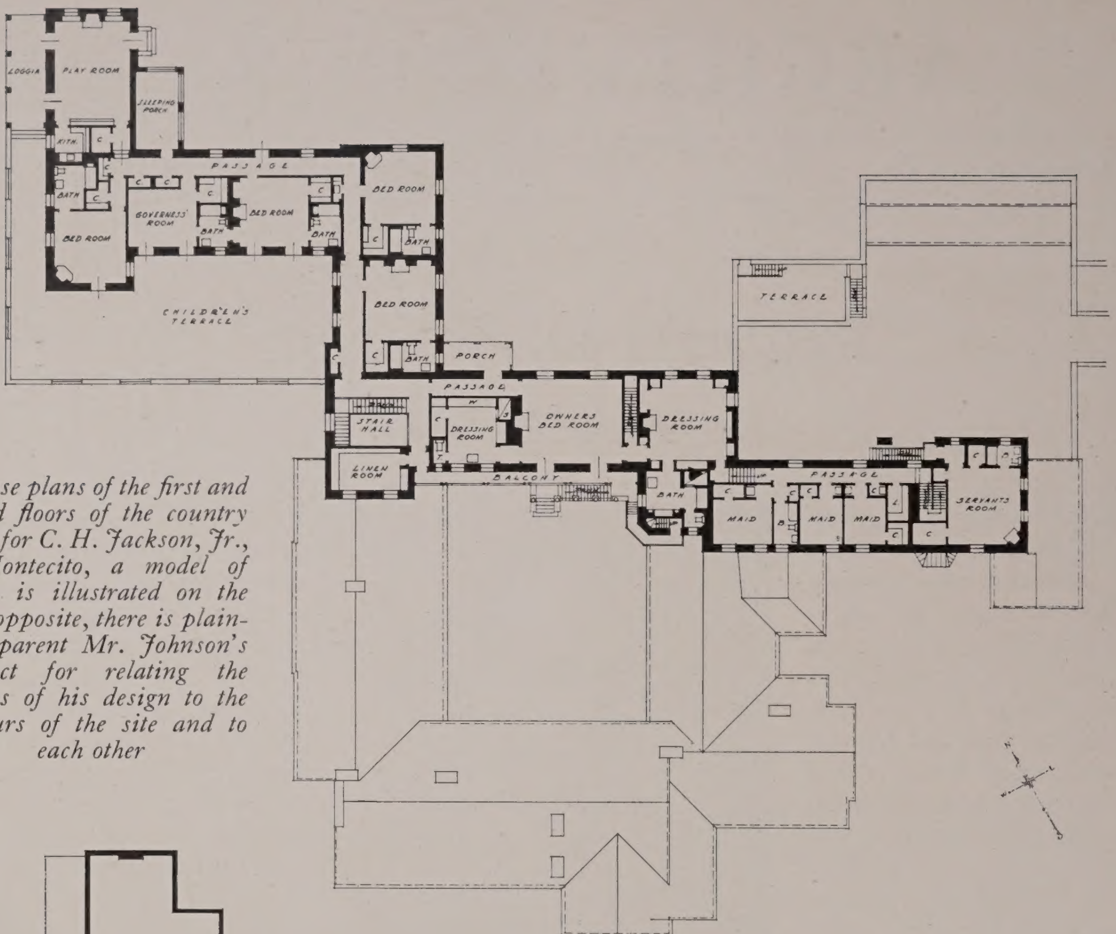


Reginald D. Johnson is primarily a designer, yet he is persuaded that architectural practice in this day and generation must first be run as a business, and it is the combination of the studio atmosphere and the business office which is, in his opinion, the modern architect's greatest problem. The word and the spirit of the studio must unfortunately be kept in hiding from the average client, as this savors too much of the impractical dreamer.

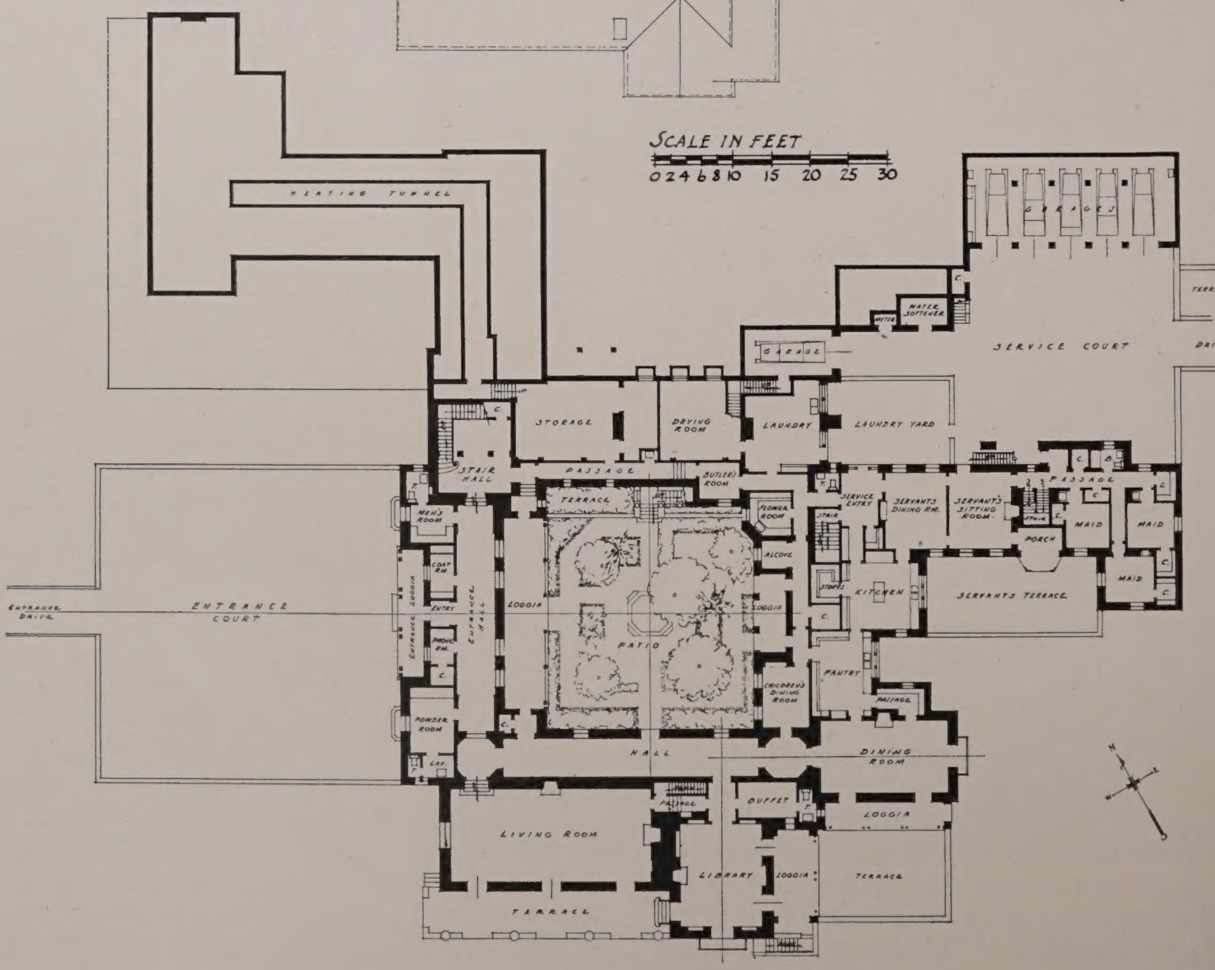
On the other hand, Johnson believes that the modern office which has not this spirit of the sculptor's or painter's studio as its foundation and very purpose of being is nothing but a glorified plan factory. If the architect is himself a designer, it is essential that he build up for his own relief an adequate business organization. Johnson has endeavored to carry this out in every possible way. Slowly but surely he has built up about him an organization that shoulders the responsibility of everything but the direct control and final approval of design. As a result, not a single drawing goes out of the office without at least his critical examination, and he also has sufficient time to spend on that all-important phase of an architect's life—the supervision of materials, including textures and colors in their various combinations.

Johnson states that from his own experience he has found that his standard of design was to a large extent directly dependent upon the amount of time which he personally has had to give to the practical and business end of his organization. The more time spent on business, the less on design. With this in mind, he is convinced that every office should consider as a prerequisite a man of thorough business training, that this man—whether he be office manager or partner—need have little knowledge of architecture. Even in a fairly small office there is, in his opinion, enough to keep such a man busy if the work is properly carried forward in a businesslike way in regard to correspondence, conference reports, contracts, prompt attention to changes and extra work, supervision of bookkeeping, etc.

One policy which Johnson has followed for many years is unusual enough to warrant special mention. It has to do with the troublesome matter of extras. If the owner changes his mind and his wishes involve an extra, it is a matter of record in writing at the time, leaving nothing to be explained in the final accounting. If, on the other hand, the office has forgotten something, Johnson insists that the contractor bill the cost to the architect himself. It goes through the usual accounting channels, is acknowledged by those in the office who have let the matter slip, it is charged to the cost of



In these plans of the first and second floors of the country house for C. H. Jackson, Jr., at Montecito, a model of which is illustrated on the page opposite, there is plainly apparent Mr. Johnson's instinct for relating the masses of his design to the contours of the site and to each other



A model of the country house for C. H. Jackson, Jr., Montecito, Calif., typical of the intricate detail in which Mr. Johnson studies, through his models, the mass, color, planting, and even the textures of walls and roofs

Photograph by Miles Berné

doing business, and acts as a very effective reminder that the office has not been quite up to its job. Needless to say, these lapses have grown less as years have gone by, and many valuable lessons have been learned once and for all as the result. Best of all, clients and contractors have been well satisfied with the justice and fairness of this policy, and many staunch friends made.

When the office undertakes a new piece of work, Johnson visits the site and works out a plan on the ground. He even goes so far as to take with him a drawing-board and instruments, and, on the development of the scheme in the office, returns to the property for a re-study of the problem.

He strongly believes that much harm has been done in the schools of Europe and this country in training men to attack a problem from too academic a point of view. He is convinced that the design can never really fit the site or be in harmony with the spirit of the surroundings unless the idea is born on the property and is a part of it. This theory, of course, is particularly true in the case of country houses.

He is a firm believer in the theory that the architect must control the fundamentals of the landscape *parti* and the interior furnishings.

In order to place the problem clearly before him, every possible idea for methodical labor-saving procedure is utilized: the questionnaire for the client, every conference made a matter of record, every agreement put in writing.

As to the progress of the work in the office itself, every traditional aid is utilized to the full: the sketch plans, elevations, sections, perspectives, clay models, more fully developed sketches and plans, and finally the most carefully executed models—usually made of cardboard with a plasteline or clay base, molded in accordance with the existing or finished contours of the property and worked out in the greatest detail so as to show the character of the texture, color of the house, and landscape development.

Entrance court of the Santa Barbara Biltmore Hotel, for which building The Architectural League of New York awarded in 1928 to Reginald Johnson its Silver Medal in Architecture for Works of Major Importance

Specification writing is delegated to others, Johnson merely outlining the important materials which are needed for the atmosphere he wishes to create.

The office produces an abundance of drawings, carried out in great detail. For instance, each room is conceived as a whole, including all furnishings, which are always indicated on the sketch plans to make sure of properly locating lighting outlets, grilles, etc. Johnson has found

Photograph by George D. Haight

Loggia, house of William C. McDuffie, Pasadena. Reginald D. Johnson, architect. (The entrance court of this house is illustrated in the frontispiece)

Above, the house of Sidney R. Francis, Pasadena, Calif. Below, breakfast terrace of the house of Curtis W. Cate, Carpenteria, Calif. Here are two excellent examples of Mr. Johnson's versatility in residential work: the suave dignity of formality in one, the charm of intimate informality in the other

Photograph by Starrett

that many mistakes can be avoided by this procedure, which is now being so generally adopted.

In the early stages of construction, Johnson leaves the details of supervision to his superintendent, but likes to watch it personally as it begins to take form. He is extremely interested in the details of mechanical equipment as well as the matter of textures and colors.

There is, throughout most of the work that Reginald D. Johnson has done, and continues to do, the necessity for lower pitched roofs, wide-spreading plans, the patio, and other similar requirements of the climate. This set of conditions is complicated by the fact that most of the families who require these homes are of Anglo-Saxon rather than of Latin descent, so that obviously it is not the solution to seize upon the Mediterranean styles and use them as they are. We find, therefore, blended with some of these elements of Mediterranean styles, other elements that belong to Anglo-Saxon tradition. The result is style, unquestionably, evolved with a degree of suavity, restraint, and a feeling for simple proportions that marks his work almost as definitely as if he had signed it.

Photograph by *George D. Haight*

The Problem of Ornament

IN TWO PARTS: PART TWO

By Claude Bragdon

THE PLATONIC SOLIDS

THE second mathematical source of ornament I found in the so-called Platonic solids. The unique, the archetypal character of these regular polyhedrons of three-dimensional space has been recognized from the most ancient times; they are the only ones which, assembled together each after its own kind, would fill that space or any portion of it without a remainder. Among the playthings of the infant Bacchus, each having its own symbolical significance, were "dice" in the form of the five Platonic solids, the implication being that upon these patterns all things in the universe are built. And so indeed it may be, for it appears that the difference between one element and another is determined by the number and arrangement of units in space. Plato assigned four of these solids to the four elements, earth, fire, air, and water, and the vessel in which they are all contained he conceived to be the sphere which he identified with the dodecahedron, because it approximates the spherical form.

Here is mathematical truth, here is "significant form," how shall we make it yield that which we seek?

Nature herself points out the way, having as it were pre-empted these shapes for her own pattern making, along with the ovoid and the logarithmic spiral, as the most cursory study of botany and crystallography makes plain. We have only to follow nature's method; not slavishly copying her patterns, but creating, with the same data, new patterns of our own.

First of all it is desirable to become thoroughly familiar with these five forms: the tetrahedron, the hexahedron or cube, the octahedron, the dodecahedron, and the icosahedron, having respectively four, six, eight, twelve, and twenty polygonal faces, as shown in illustration 9. A good way to get to know these figures is to make paper models of them according to the familiar kindergarten method of cutting and folding. The lower part of illustration 9 shows them in their unfolded form. It would be better still could we have models of them made of glass, for by looking *through* these the intricate inter-relationship of the lines formed by the intersection of their bounding surfaces could be studied from the point of view of pattern in space. This can be done almost equally well, however, by means of plane projections, treating the solids as though they were transparent, the far side being shown as well as the near. A number of such projections are shown at the right in illustration 9, for convenience of identification the near side being shown in solid lines and the far side in dotted.

The translation of these unfolded and projected Platonic solids into ornament is easy because they possess intrinsic beauty by reason of the fact that they are graphic representations of mathematical truth, just as magic squares are. Of this order of truth beauty is as it were the *shadow*, a thing invisible until its shape and presence be revealed by something upon which

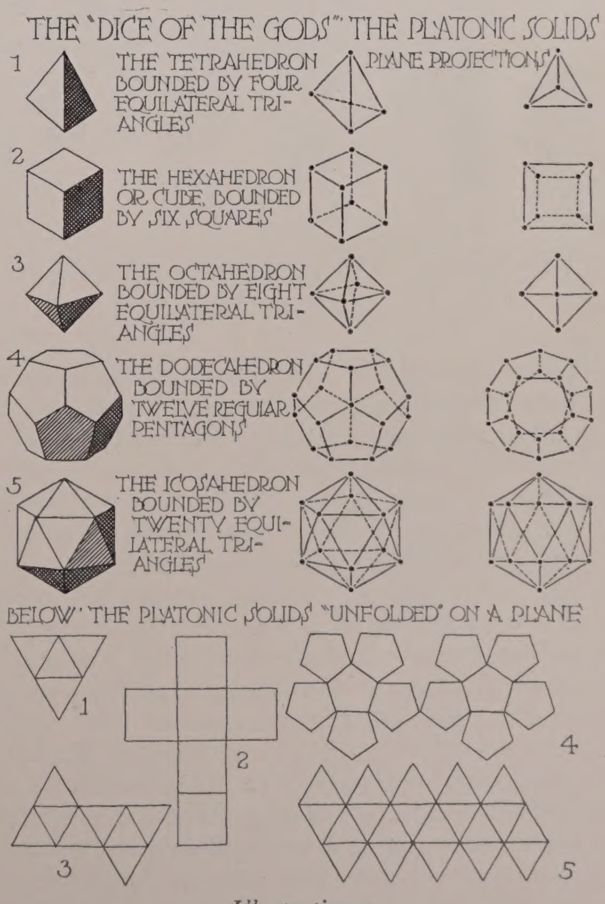


Illustration 9

it can be cast. The "shadow" of a magic square graphically is its magic line; and the shadow of a Platonic solid on a plane is the network of lines made by its plane projection. Illustration 10 shows the direct translation of these into ornament. In illustration 11 this is accomplished

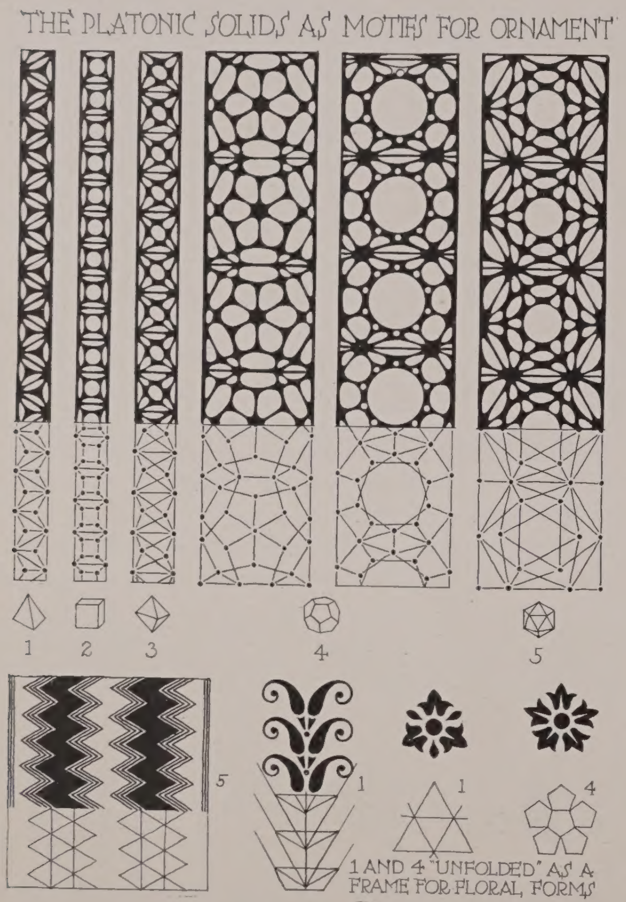


Illustration 10

with more success and subtlety. It will be easily seen that the design of the doors is derived from one plane projection of the dodecahedron, and that for the window above from another. The leaded-glass design in illustration 12 is derived from a projection of the icosahedron not shown by any diagram but readily recognizable nevertheless. The lighting fixtures which are so prominent a feature of this interior have been given the form of icosahedrons and dodecahedrons, the largest one being a polyhedron bounded by pentagons and hexagons.

I am confident that more and better ornament than any here shown can be derived from the Platonic solids, but these will serve to prove my point that numerical arrangements and geometrical forms which are rich in significant mathematical properties are by reason of that fact raw material ornament. By the skilful use of such material the designer will snare a beauty altogether transcending his personal power of evocation. His success, however, will depend less upon a mechanical adherence to the particular lineal "web" of his selection than upon the æsthetic sensitivity which prompts him to depart from and take liberties with it even while using it as a sub-structure. Mathematical aids to design, like the machine in the modern world, should be subservient to the human spirit. Greek athletes rubbed their bodies with sand and oil. In this connection mathematics may be thought of as the sand, and the æsthetic intuition as the oil.

HYPERSOLIDS IN PLANE PROJECTION

My third source was an extension of the second (the plane projection of the Platonic solids) but an extension in an absolutely new direction —"a direction at right angles to every known direction"—into four-dimensional space, in point of fact. Now although the fourth dimension may be only a fairyland of mathematics, it can be made use of, and my own use of it constitutes, as I believe, a contribution to æsthetics

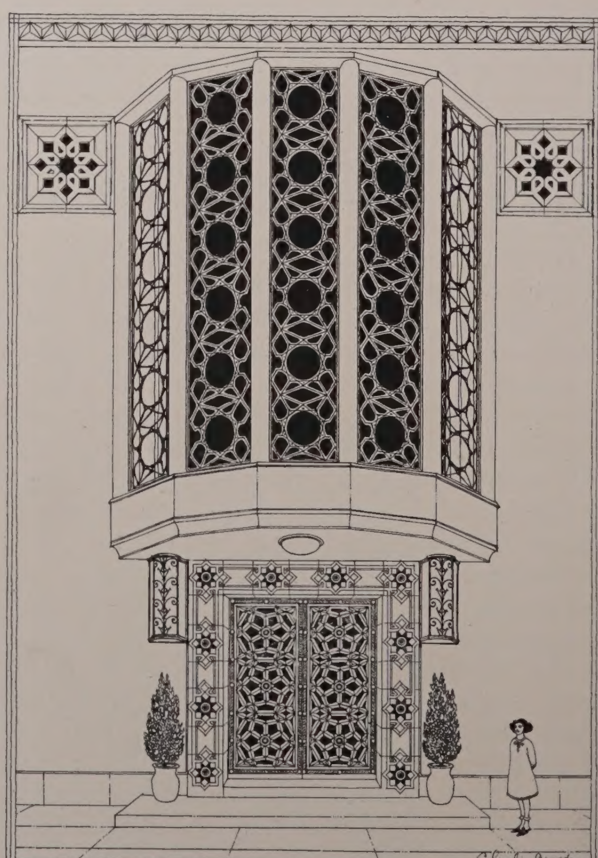


Illustration 11

of no small interest and importance. This was recognized by architect C. Howard Walker—himself the author of a book on ornament—as early as 1915, for in a review of "Projective Ornament" in *The Architectural Review* he says:

"Mr. Bragdon's knowledge of geometry has led him to an initial application which is practically a discovery of a hitherto unused method of enriching geometrical design. It is a very valuable addition to the formulæ of a designer. Among the chief faults in geometric design have been the paucity of detail and meager modulations of varying scale. In order to obtain this, subdivisions of an unimaginative type or else mere filling patterns in geometric units have been adopted. The development in the fourth dimension has filled these needs without resorting to either subterfuge. It is a development which greatly enriches the geometric *foci* and creates its own detail. Modulation and variation of scale occur naturally in every case, and monotony is diminished."

Now the world of the fourth dimension is a paradoxical world, and its forms are in a literal sense fantastic, but they are *mathematically true* nevertheless, and that is the only thing which need concern us in this connection. The regular hypersolids of four-dimensional space—analogous to the Platonic solids of three-dimensional space—are the "fantastic forms" which will

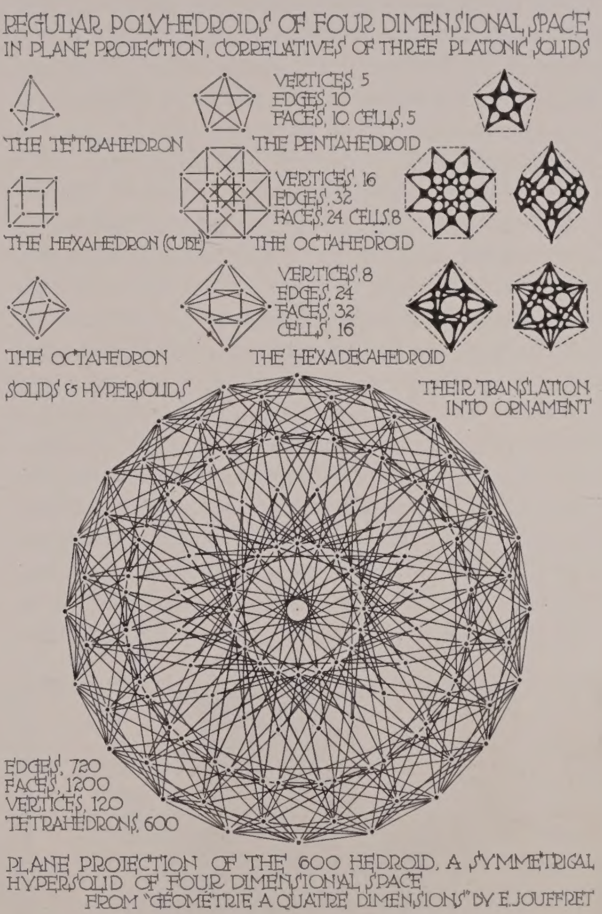


Illustration 13

prove useful to the designer of ornament. These—the number and relative position of their vertices, lines, planes, and bounding solids—can be as perfectly known to the mind as the Platonic solids themselves. By a graphic process analogous to the perspective method (by means of which a three-dimensional solid can be represented in plane projection) they can be reduced to linear diagrams, and these representations, enormously more rich and various than the plane projections of the Platonic solids themselves, constitute my third source of ornamental design.

To describe the method whereby these two-dimensional representations of four-dimensional forms are achieved is outside the province of this essay, which aims only to be a concise record of work accomplished, with the presenta-

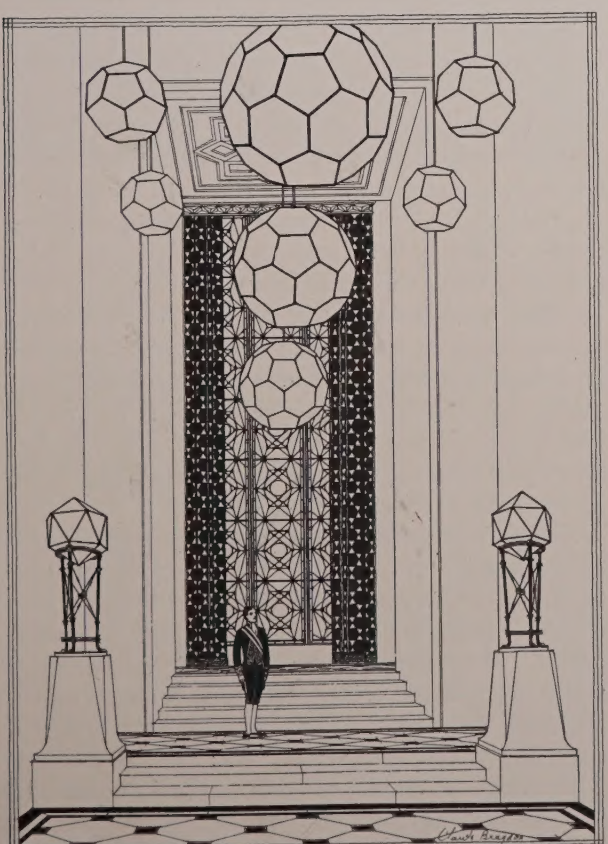


Illustration 12

tion of a few achieved results. But there is no mystery about this method, and any one with an elementary knowledge of descriptive geometry can learn it as easily as he learned perspective—perhaps more easily.

Illustration 13 shows the pentahedroid, the octahedroid, and the hexadecahedroid in plane projection. These are the four-dimensional correlatives of the tetrahedron, the hexahedron, and the octahedron. That they are rich in decorative possibilities is evident at a glance. The central figure on the rug in illustration 6 (April) is derived from the octahedroid and the hexadecahedroid, and the side figures are from a different projection of the last named form (see illustration 5). The rug design in illustration 14 was determined by four octahedroids in juxtaposition (cubes within cubes with vertices joined). The design for the sofa-covering in this illustration and for the wall-hanging in illustration 7 are both derived from two different projections of the hexacosihedroid in the manner shown in illustration 13. The intricate diagram at the bottom of illustration 13 is a complete projection of this same hypersolid. This is an exhaustless mine of beauty in which I have repeatedly delved. For example, every pattern in illustration 15 is derived from one or another plane representation of this hypersolid of the six hundred sides. The sunburst surrounding the clock in illustration 16 is derived from the double pentagonal pyramid which forms a constituent of the hexacosihedroid. Indeed, it might almost be said that this figure alone is the egg, so to speak, of a new ornamental mode.

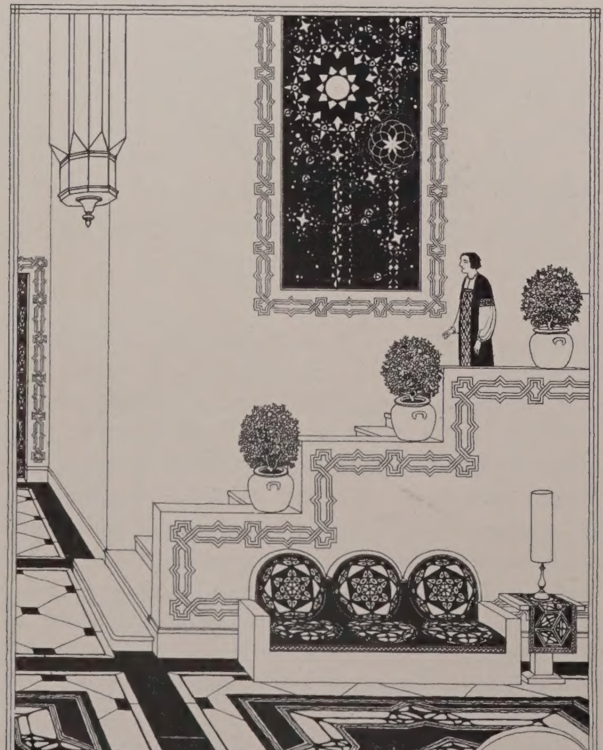


Illustration 14

THE IMPORTANCE OF MATHEMATICS IN THE MODERN WORLD

But, quite aside from its intrinsic value, dwelt upon by Mr. Walker, this source of decorative design has a symbolical value to which I desire now to call attention. In order to make my meaning clear it will first be necessary to give a thought to the purpose and function of ornament. Bear with me, therefore, while I wax philosophical.

Economic and structural necessity are at last driving us to the development of an architecture of our own, the forms of which are logically and inevitably determined by their functions, as in the case of a machine. And because it is the machine ideal which inspires this architecture, everything which is not directly contributory to some kind of *usefulness* is theoretically tabu. Now ornament has no usefulness save to adorn and provide delight to the eye; therefore an outstanding characteristic of the best modernistic architecture is the general absence of ornament. When ornament is introduced one rather wishes it were not, because for the most part it is inorganic and meaningless.

The machine ideal applied to architecture, save in its most utilitarian phases, is a false one, or at least it needs to be supplemented by something else. *Man cannot live by bread alone;* he requires also that wine of life which is beauty. Our age requires, no less than antecedent ages, an ornamental mode.

Now ornament springs from an impulse no less natural and primitive than singing and dancing—it may even be the same impulse, for is not ornament an arrested song, a frozen dance? At all events the desire for decoration arises from a psychological need rather than a physical necessity. This is why ornament is ever the mirror of the national and racial consciousness—so much so that any mutilated and time-worn fragment out of that past when art was a language can with certainty be assigned to its place and its period. But the ornament in

use to-day, whether derived or invented, reveals nothing of our national or racial consciousness except its æsthetic sterility. What we need therefore is an ornamental mode eloquent of our unique psychology, derived from some source from which our power is drawn and in which our interest is centred.

Illustration 15

Now in the last analysis that power is derived from mathematics, as it is the only subject which is universally taught. It is the magician's wand without which our workers of magic, be they bankers, chemists, physicists, engineers, or what not, could not perform their tricks. Of course this is no new thing: mathematics has long been made to serve man's uses, but never before so universally and so successfully, for it threatens to swallow all other knowledges as fast as they are born. Moreover, since the advent of non-Euclidian geometry the field of mathematics has been enormously enlarged, and partly by reason of the Einstein theory has assumed a new importance—has even achieved *front-pageism*, in point of fact. Space-time, curved space, the fourth dimension, have become catchwords of the day and hour; curiosity is as definitely centred on scientific invention and discovery of which mathematics is the guiding light, as ever the mediæval mind was centred on Christ, the Virgin, the disciples, and the saints. It was for this reason that the cathedrals were decorated with their images, and by a parity of reasoning mathematics might be made to furnish forth an ornamental mode for the modern world.

I know that the so-called æsthetic temperament has a natural distrust of and aversion to, sometimes amounting to a subjective fear of, everything which savors of the mathematical, seeing in it something inimical and inhibiting to the free play of the creative imagination. But this is a fear born of ignorance and educational malpractice. There is nothing so liberating to the spirit as fourth-dimensional thought. It could be, not the ravisher but the lover, leading away into star-gardens of delight, and fecundative of new forms of visible beauty. If, after having read what I have written here, the reader says, "All this is above my head," I can only answer, "No, it is not; it is close beside your hand!"

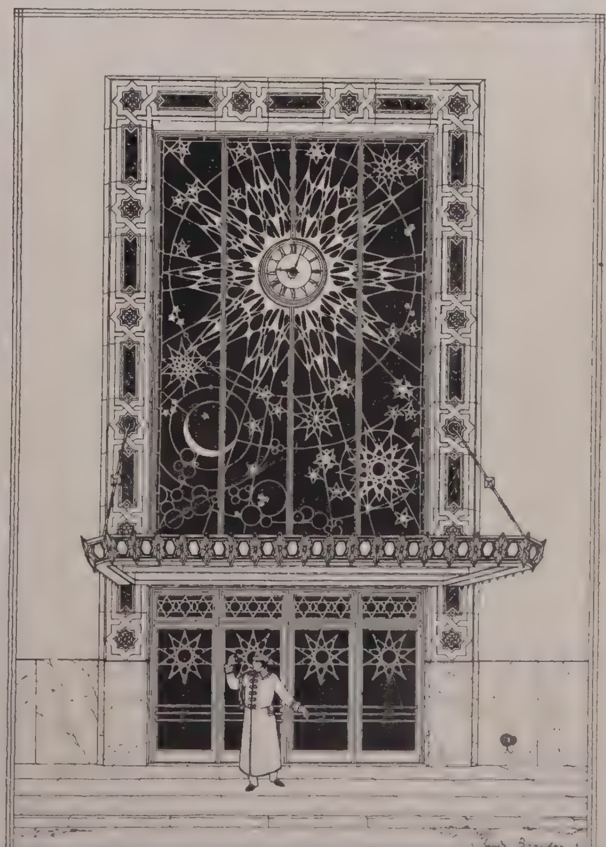
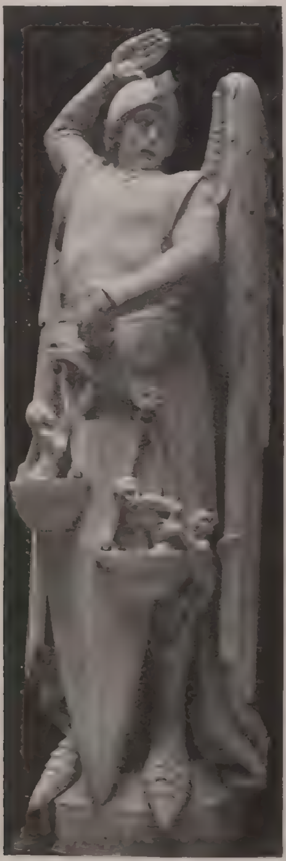


Illustration 16

Model of the George Washington National Masonic M morial, Alexandria, Va. Corbett, Harrison & MacM ray, architects; Osgood & Osgood, associate archite

The proposed Samuel Gompers Industrial High School for Boys, the Bronx, New York City. Walter C. Martin, architect

Architectural New



St. Michael, the Archangel, for the apex of the north tower portal, Cathedral of St. John the Divine, New York City. John Angel, sculptor

Some friends of Kenneth M. Murchison, New York, have presented him with this bronze medal modelled by William Collins

As chief of the Industrial Arts Division, Chicago Exposition, Ely Jacques Kahn has designed this building to contain the exhibits of the decorative arts, crafts, city planning, and building materials

Forum of the Education Building, Capitol Group, Harrisburg, Pa. Gehron & Ross, architects; Eric Gugler and Ricard Brooks, mural painters

Memorial window, Church of the Ascension, M Vernon, N. Y., in which James H. Hogan has dev oped a new technic for the "window" to be viewed reflected light. Executed by James Powell & Son, L

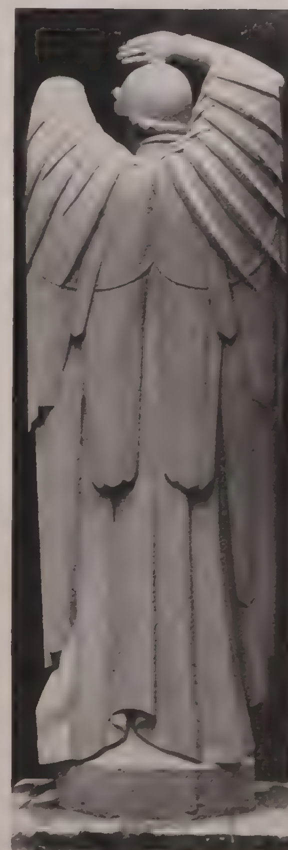
Proposed dormitories at Wheaton College, Norton, Mass. Cram & Ferguson, architects

n Photographs

Horace Mann Junior High School in Denver, Colo., completed last September. T. H. Buell & Company, architects

Reverse of the medal presented to Kenneth M. Murchison, symbolizing some of his many attributes

Back of John Angel's figure of St. Michael for the Cathedral of St. John the Divine, carved out of a single block of granite by Edward Ardolino



An airport hangar at Pembina, N. D., located on the site of an old fort. It is the port of entry near the Canadian border. Ellerbe & Company, architects

A model of a museum now under construction at Corinth, Greece, to house the results of the American archæological explorations. Thompson & Churchill, architects

Proposed Convent of Our Lady of Lourdes, Brooklyn, N. Y. Henry V. Murphy, architect. Rendering by W. C. Douglas

BOOK REVIEWS

EARLY CONNECTICUT ARCHITECTURE. Second series. By J. Frederick Kelly. 20 plates, 14 by 19 inches folded to 9½ by 14 inches. New York: 1931: William Helburn, Inc. $10.

Mr. Kelly's painstaking researches into the methods of the early Connecticut builders first became widely known through the publication in 1924, by the Yale University Press, of his book, "The Early Domestic Architecture of Connecticut." No one has done for any other of the geographical divisions of our early architecture what Mr. Kelly has done for Connecticut. The present volume is a series of carefully chosen details shown by measured drawings and photographs. These have been selected as only one with Mr. Kelly's knowledge could select them, and the drawings are well made and reproduced at the customary usable scales.

RED CEDAR SHINGLES. Commercial Standard CS31-31. 16 pages, 5¾ by 9¼ inches. Washington: 1931: U. S. Department of Commerce, Bureau of Standards. 10 cents.

UNDERPINNING. Its Practice and Applications. By Edmund Astley Prentis and Lazarus White. Introduction by William A. Starrett. 318 pages, 6¼ by 9¼ inches. Illustrations from photographs and drawings. New York: 1931: Columbia University Press. $7.50.

The authors, who are members of the firm of Spencer, White & Prentis, actively engaged in the construction field, particularly in subway, foundation, and underpinning work, here bring the little known science of foundation building up to date. The authors have not hesitated to add information as to methods and processes that might reasonably come under the heading of trade secrets.

PLYWOOD (Hardwood and Eastern Red Cedar). 23 pages, 5¾ by 9 inches. Illustrations from drawings. Commercial Standard CS35-31. Pamphlet binding. Washington: 1931: U. S. Department of Commerce. 10 cents.

A HISTORY OF THE ENGLISH HOUSE. From Primitive Times to the Victorian Period. By Nathaniel Lloyd. 487 pages, 8¾ by 12½ inches. Illustrations from photographs and drawings. Printed in Great Britain. New York: 1931: William Helburn, Inc. $20.

English domestic architecture has an extensive literature, particularly in the pictorial aspect. It deserves it. Mr. Nathaniel Lloyd's contribution to this history is largely a re-arrangement of material. His illustrations, which necessarily repeat many examples which have been widely published, are grouped by subject rather than by date: exteriors, external wall treatments, gate houses and gateways, entrances from without, entrances from within, porches and porticos, doors and doorways, windows and the like. Added to the larger and better-known examples are many details of smaller and less conspicuous work that find a place in this volume by reason of this new scheme of arrangement.

FURNITURE. Its Selection and Use. Report of the Subcommittee on Furniture of the National Committee on Wood Utilization. Foreword by Axel H. Oxholm. 115 pages, 5¾ by 9 inches. Illustrations from photographs and diagrams. Pamphlet binding. Washington: 1931: U. S. Department of Commerce. 20 cents.

THE BROWN DECADES. A Study of the Arts in America, 1865–1895. By Lewis Mumford. 266 pages, 5½ by 8 inches. Illustrations from photographs. New York: 1931: Harcourt, Brace & Co. $3.

Lewis Mumford inserts his critical scalpel into the arts of America during the years following the Civil War, finding, in what we have been prone to consider a sterile age, the beginnings of a new Renaissance. He deals with the architecture of Richardson, Root, and Sullivan; the engineering of Roebling; the landscape work of Marsh, Olmsted, and Eliot; and the graphic arts in the work of Winslow Homer, Eakins, and Ryder.

CONTEMPORARY AMERICAN ARCHITECTS. 120 to 124 pages each, 7½ by 9½ inches. Illustrations from photographs and drawings. New York: 1931: Whittlesey House—McGraw-Hill Book Co., Inc. $3 each or $8 a set.
RALPH ADAMS CRAM
RAYMOND M. HOOD
ELY JACQUES KAHN

Arthur T. North has undertaken the interesting task of delineating, in a series of small volumes, some of the personalities best known in the architectural profession. His text is very short and concise, his illustrations many and representative. It is an encouraging fact that America has reached a point in her æsthetic development when she will, presumably, buy books about her individual architects.

PROPERTIES OF FIBER BUILDING BOARDS. By C. G. Weber, F. T. Carson, and L. W. Snyder. 14 pages, 5¾ by 9 inches. Illustrations from diagrams. Miscellaneous publication, Bureau of Standards, No. 132. Pamphlet binding. Washington: 1931: U. S. Department of Commerce. 5 cents.

THE DRAMA OF BUILDING: I

A SERIES OF PHOTOGRAPHIC STUDIES BY JEANNETTE GRIFFITH WHICH MAY HELP US TO APPRECIATE THE STIRRING MAGNIFICENCE OF OUR OWN CONTRIBUTION TO THE HISTORY OF BUILDING

Jeannette Griffith *DEMOLITION*

SOUNDING ROCK BOTTOM

Jeannette Griffith
On the opposite page,
SHORING

SEEKING ROCK BOTTOM UNDER WATER *Jeannette Griffith*

Characteristics of Some Important New Cabinet Woods: I

By Alfred Berman

IT was not very long ago, indeed within the memory of most cabinetmakers and many architects, that the fine cabinet woods in common use were counted on the fingers of two hands. A well-stocked lumber and veneer yard dealing in fancy woods carried supplies of the various species of oak, walnut, and mahogany, with an assortment of domestic hardwoods, such as cherry, birch, and maple, and in addition small quantities of exotic woods for the furniture and marquetry trades, such as satinwood, rosewood, boxwood, tulipwood, etc. Few other hard woods were commonly known to the trade, and, strange to say, none seem particularly to have been desired. Such new woods as appeared were eyed askance and cautiously left to languish in the lumber yard.

Today, all that has been changed. Under the impetus of the so-called modernistic style of design, which has set up a cult for vivid coloring and rich materials, the forests of the world were forced to yield of their treasures, and the result—at once admirable and appalling—was a veritable deluge of new and exotic woods, a deluge which has intensified rather than lessened with the passing of the years. Each day exultant veneer dealers exhibit their latest find to eager designers and bewildered cabinetmakers. Often the same wood is exhibited a number of different times by different dealers—each time with a different name, and often a different origin. The advent of new woods meant for the cabinetmaker the advent of new problems—problems of gluing, problems of veneering, problems of finishing, the multiple problems of the usability of the wood; in what forms, for what purposes, with what methods? Would the wood stand up well? would the coloring fade? would it finish well? Of rumor, opinion, and misinformation, there was a plenitude; of reliable information, practically none. It was almost necessary to work by the trial-and-error method.

The confusion was further heightened by the lack of co-ordination which has always marked the lumber trade and which made itself especially felt during these times. Many attempts have been made to introduce some form of scientific nomenclature in the trade, but with little success. Among lumber and veneer dealers and cabinetmakers it has always been the custom to classify a wood empirically, according to the salient characteristics of the wood itself. If a wood possess the physical properties of mahogany, then mahogany it is, irrespective of its origin or its botanical classification. If it resembles walnut, then walnut it is, and so on. Our botanists, on the other hand, name wood according to the tree from which it comes, and the tree they classify into genera and families, according to the flowers, the fruits, and the foliage. The general public, however, may know the tree by still another name, or a series of names, which are as spontaneous and popular in their origin as a folk-song or a ballad. To illustrate, the cherry wood most highly prized for cabinet work is known in the trade as red cherry, the wood having a reddish cast. To the botanist it is known as *Prunus serotina*, and to the general public it is commonly known as black cherry (from the color of its bark) or wild cherry (from the method of its growth). Thus a wood newly appearing on the market may be called by one of a number of popular names enjoyed in its native land, or it may be endowed with a galaxy of different names by each veneer dealer or log merchant who imports and distributes it, and, finally, the botanist will attempt to classify it—often on the basis of incomplete or incorrect data.

Of all the woods which have been introduced in the past decade it would be difficult and needless to write. A goodly part has long since been relegated to the limbo of woods "tried and found wanting"—wanting in beauty, in charm, in availability, usability, or standing qualities.

Listed below are some of those which seem to have survived the primary struggle. They are woods, unknown or little used ten years ago, which are being employed with increasing frequency today for fine cabinet work, and are likely to continue to be used on account of certain inherent merits which they possess.

In order to clarify some of the descriptive terms generally applied to wood, the following definitions are suggested:

Figure is a trade term of somewhat loose application that appears to include any variation or contrast presented by the surface of the wood. In general it may be said to be due to the following factors: difference in size and arrangement of cells; distortion in the alignment of the fibres; irregularities in the infiltration of pigment in the wood; variations in size and character of the annual rings; occurrence and size of pith rays.

The term *grain* is often used interchangeably with the term *figure*, resulting in confusion. As used hereafter, it will connote simply the alignment and direction of the wood fibres.

Texture, on the other hand, refers to the relative size of the wood fibres or pores.

Gloss and *lustre* are terms referring to the manner in which light is reflected by the wood elements.

It should be noted that the comments which follow are applicable to the various woods described principally in the veneer form, rather than in the form of lumber. Due to the costliness of these woods and the requirements of the modern woodwork industry, almost all of these woods, and particularly the finer ones, are cut or sawed into veneers from one-twentieth to one-twenty-eighth of an inch in thickness. This veneer is then used as the face covering of scientifically constructed plywood panels, from which the best furniture and panelling are today made.

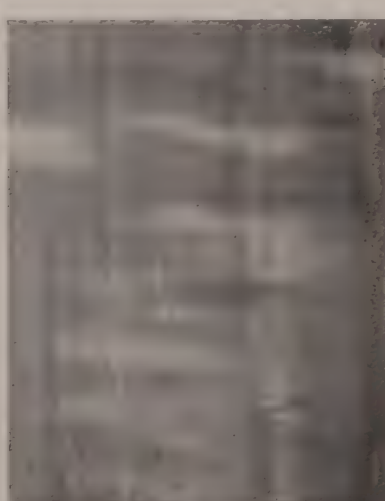
AMARANTH (*Peltogyne*), also known as purple heart and violé, is in no sense a new wood, having been used to some extent since the eighteenth century, along with kingwood and tulipwood, for inlay work. It is only lately, however, that the wood has come to be employed for wood panelling, store fixtures, and furniture. Amaranth, a native of Brazil, is a very hard and heavy wood, straight grained and fine textured. Its most distinctive feature is its color. When first cut the wood is colored a dull brown, but after exposure to light and air it turns to a uniform purple hue, entirely distinctive and unlike the color of any other wood. It has a fair degree of natural lustre and finishes well. As is to be expected in a wood of such delicate color, streakiness and discolorations frequently are found to mar the uniformity and beauty of the coloring. These must be carefully eliminated if the wood is to show up to advantage.

ACAPOU (see Hudoke).

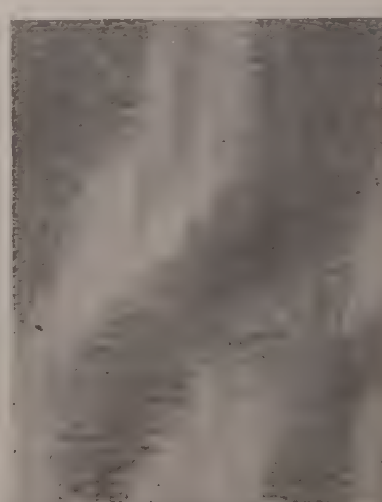
ASPEN (*Populus alba*), also commonly known as white cherry and silver poplar. It is a member of the true native poplar family, often known as cottonwood, and not to be confused with the incorrectly named yellow poplar (*Liriodendron tulipifera*) which produces the wood known in the trade as whitewood. Aspen possesses a very wide sapwood, almost white in color, while the heartwood is a light brown. The wood is very lustrous, and cutting on the quarter often produces a highly mottled effect, which is one of the principal reasons why it is advanced as a substitute for satinwood. This same poplar tree produces a crotch known as aspen crotch, which is often very highly figured and possessed of great beauty. Due to the softness of the wood, it is said to "stand up" better than most other varieties of crotches, which, as a rule, are given to checking badly. This poplar or "white cherry" is suitable for use wherever a highly figured light colored wood is desired, and where the contrast in color between heartwood and sapwood is not objectionable.

AVODIRE (*Turræanthus africana*). This wood is the product of one of the immense trees which

Amaranth, or purple heart



Aspen, or white cherry



Avodire, vertical figure

characterize the jungles of tropical West Africa, on the Ivory Coast. Botanically the tree is related to African mahogany, being a member of the *Meliaceæ* family, and its conditions of growth are almost the same. The wood ranges in color from milky white or cream color to a bright gold. When cut on the quarter, avodire offers a variety of figure—stripe, mottle, combinations of both, with predominating figure both vertical and diagonal. The texture and structure of the wood, as well as its working qualities, are very similar to those of African mahogany, but its figure and color more closely resemble those of East Indian satinwood. It has been widely used in place of primavera, due to its greater uniformity in color and its superiority in the matters of dimensions and soundness. In selecting, care must be exercised to guard against pin knots and wind breaks, which are widely present in the wood. From the cabinetmaker's viewpoint, avodire is one of the best of the newer woods.

AUSTRALIAN BLACKWOOD (*Acacia melanoxylon*). This is a very fine cabinet wood, native to Australia. Botanically it is a member of the Acacia family, and is thus related to the Shittum wood designated in the Old Testament as the wood from which the Ark of the Covenant was built. In color the wood is not black, as one might assume from the name, but is of a rich reddish-brown color with narrow pencil stripes in harmonizing color. Well-figured quarter-sawn blackwood is shot through with a well-pronounced "cross-fire" or fiddleback figure, which, coupled with the high natural lustre of the wood, lends to it life and beauty. It is a fairly hard wood, straight and wavy grained with a close and even texture. It works well and stands up excellently, according to reports from its native land, where it has been used for many years in fine cabinet work. Despite its animated figure, it is a dignified and rich wood, and may be used safely in place of such old aristocrats as English brown oak, French walnut or figured teakwood.

AFRICAN WALNUT (see Tigerwood).

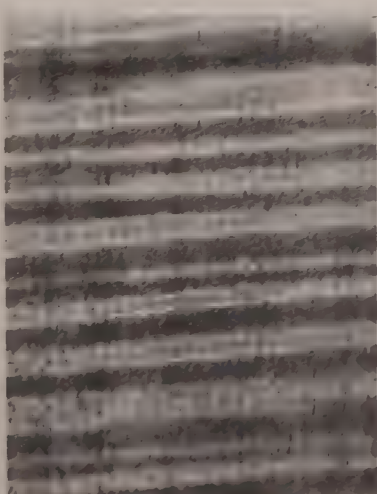
BOSSÉ (*Guarea cedrata*). A light pinkish-colored wood from the Ivory Coast of Africa. It is a close-grained, tough, and rather heavy wood, not unlike African mahogany in many of its properties, but without its beauty of figure and coloring. Bossé, when well figured, possesses a curly or rolly sort of a figure. The wood is chiefly used when a quiet wood of pinkish color is desired.

BUBINGA (*Didelotia africana*) is also known as African rosewood or false rosewood of the Congo, on account of its color and origin. A native of the African Gold Coast, whence many of our newer woods have come, Bubinga ranges in color from a rose-purple to a light wine color or cherry. It is generally possessed of a very pronounced mottle figure. It is moderately hard, straight grained, even textured, and is procurable in excellent lengths and widths. Unfortunately, these excellent qualities are frequently offset by the prevalence of large and blotchy discolorations, which render the wood unsuited for use in large surfaces. Flitches should be carefully scrutinized for this defect. Were it not for this disfigurement, bubinga would be much more widely used for panelling and cabinet work.

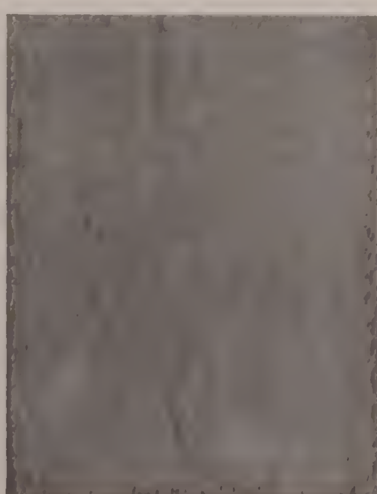
BRAZILIAN WALNUT (see Imbuia).

GONCALO ALVES (*Astronium fraxinifolium*) is a native of eastern Brazil, where it is widely used for furniture and cabinet work. In color it ranges from light to dark brown or reddish, with widely spaced broad black stripes, which render it somewhat strident for those whose taste runs to dignity in wood. The wood is moderately hard and heavy, fairly straight grained, with a fine close texture. In many ways it resembles golden Macassar ebony. While the logs are of good size, the wood is generally

Avodire, diagonal figure



Australian blackwood



Bossé

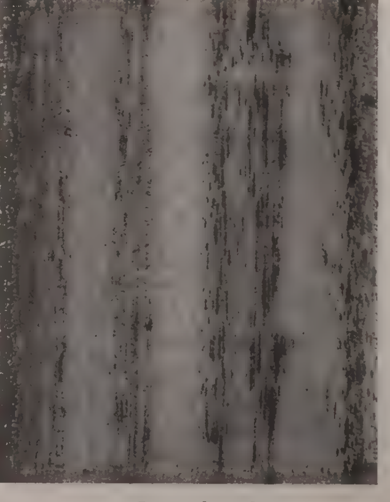
possessed of many defects which must be cut out, thus reducing the size of the usable portions, and rendering the wood unsuitable for large surfaces. It makes an interesting and sometimes striking furniture wood, and is highly esteemed by many cabinetmakers.

ENGLISH HAREWOOD (silvery gray, natural, and pink) (*Acer pseudoplatanus*) is a wood which has been engulfed in clouds of confusion since it first appeared on our shores. Among dealers the wood is most often characterized as "dyed English sycamore," though it has also been called "dyed Norwegian maple" and several other names. A veil of mystery and strange tales has been drawn about the wood by those who first introduced it on the market, in order to confuse potential competitors by obscuring its origin. Gray harewood is in truth the wood of the European maple tree, dyed to a silver-gray color by various mechanical and chemical means. It was apparently first so dyed with success in France, and later in England and Germany. American efforts have so far been unsuccessful, resulting in a dark and smudgy appearance which is most undesirable. Mr. C. D. Mell, an authority on woods, has pointed out that in England the wood of the genus *Acer*, maple, is popularly called sycamore, whereas the wood we name sycamore is there known as planetree. It is this ambiguity in nomenclature which has further served to obscure the true origin of this wood. The physical characteristics of gray harewood are very similar to those of our native white maple, with the added feature of a very sharp and fine fiddleback figure which traverses the wood often from edge to edge and lends to it beauty and mobility. The European dyed wood is a light silvery gray in color and possesses a metallic sheen which adds greatly to its effect and to its glamour. The great delicacy of its coloring and the fragility of its physical structure necessitate the most careful handling of gray harewood in every step of the manufacturing process—from the veneering to the final finishing. A tendency to change color after a certain period of time has been charged against gray harewood, which, if substantiated, may ultimately cause it to fall into disrepute in the dyed form. English sycamore—maple, which has not been dyed, is referred to as natural harewood, or natural English sycamore. When exposed to the elements for some considerable time it turns light tan or pink, and is then known as weathered or pink harewood. It is even sometimes stained to a deep pink hue, but is little used in this form.

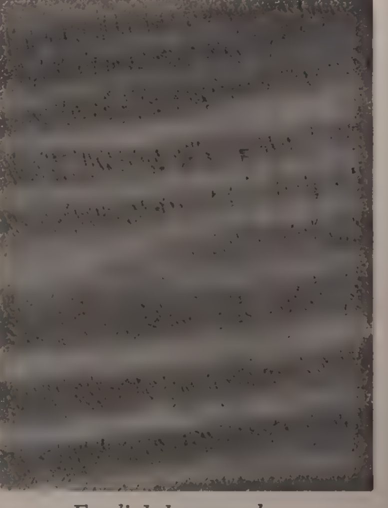
HUDOKE is a wood recently introduced from Brazil and modestly named by the importer after himself. It has been variously described as Brazilian Acapou (*Vouacapou americana*), a member of the pea or *Leguminosæ* family, of which our native black locust is a representative, and also as Sucupira (*Bodichia nitidea*). It is a hard and very dense wood, straight grained but of coarse and open texture. Its color, which constitutes the greatest part of its charm, is a rich brown. In figure it presents a striped effect when cut or sawn on the quarter, due to the opposing directions of the fibres. Hudoke is being offered on the market as a substitute for English brown oak, but is in no way related to the oak family. Caution must be exercised in the use of this wood, as samples have shown evidences of pronounced checking—which may be due to the wood's great density.

IMBUIA, Embuia, or Imbuya (*Nectandra*), also known as Brazilian walnut, although in no way related to the *Juglans* or walnut family, is one of the best-known hardwoods of southern Brazil, and botanically is a member of the laurel family. In color it varies from a light yellow or olive to a dark chocolate-brown. Often it presents a field of light tan with narrow dark stripings. In figure it ranges from a straight stripe to a wavy or curly effect, with mottle. It is fairly hard and heavy, being similar to

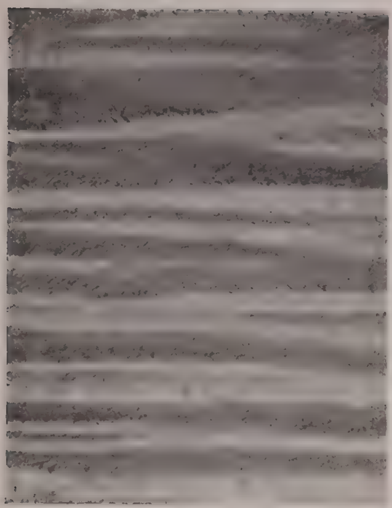
Bubinga



Goncalo Alves

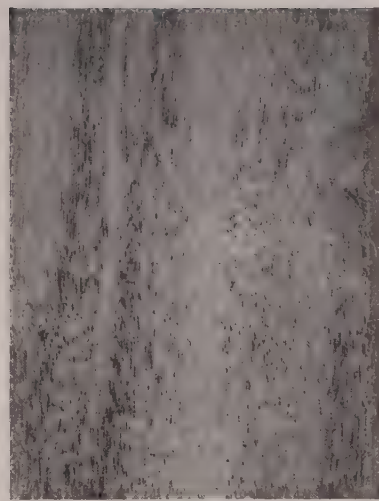


English harewood, gray



English harewood, natural or pink

Hudoke



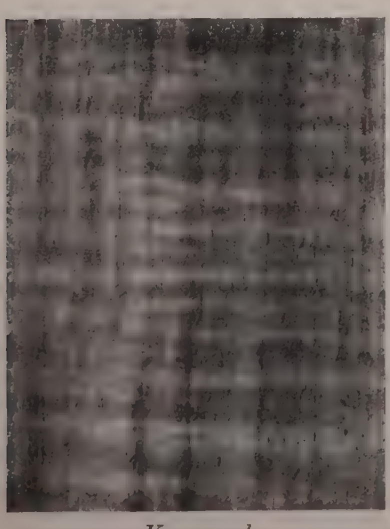
Imbuia

walnut in its physical properties, although its texture is much finer. It has a spicy and resinous odor, and suffers from the prevalence of wormholes, which are troublesome to the cabinetmaker. Its sawdust has proven to be irritating to the skin of the workman, causing swellings and rashes. Imbuia has met with great favor among certain designers and cabinetmakers, and is procurable in excellent dimensions.

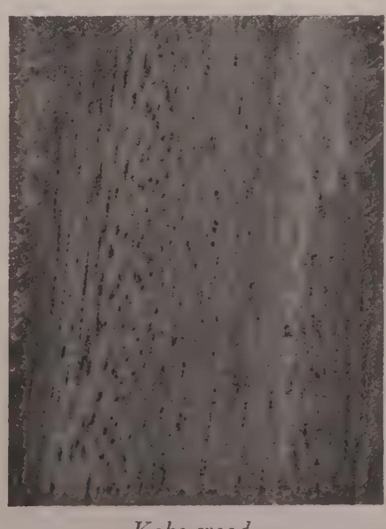
KOA WOOD (*Acacia koa*) is a member of the acacia family, closely related to Australian blackwood, described above, and bears great resemblance to it. In the Hawaiian Islands, where it is native, it has long been used in the fabrication of mandolins and other musical instruments. The color of koa wood is somewhat lighter than that of blackwood, being prevailingly tan, but it is characterized by the same varicolored stripes, both narrow and wide, and the same rolly little fiddleback figure. Care must be exercised to guard against streakiness and excessive gum deposits in the wood.

KOKO WOOD (*Albizzia lebbek*) is a chocolate-colored wood, sometimes called East Indian walnut, emanating mostly from Burmah. Koko wood is quite hard and dense, with a wavy or straight grain and a very open-pored and coarse texture. While the predominating color is generally that of a dark walnut, it is frequently marked by a series of darker, wavy, irregular stripes. The color is quite pleasing for so dark a wood, and as it finishes well, koko wood often makes a rich and pleasing background.

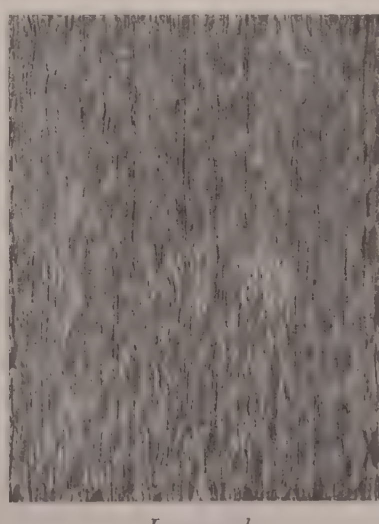
LACEWOOD, also known as selano, or Australian silky oak, is a native of Australia. Botanically it has been variously classified as *Stenocarpus sabignus* and *Grevillea robusta*. In color it is a reddish brown or rose-brown, and when quarter-cut is invariably marked by a multitude of small, elongated flakes or "raindrops," like the "silver grain" in quartered oak or beech, which are due in this case, as in that of oak and beech, to the prominent pith rays characteristic of the tree. Unlike the "silver



Koa wood



Koko wood

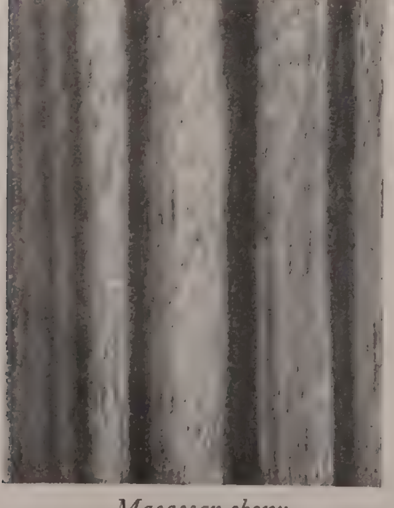


Lacewood

grain" of oak, that of lacewood is uniform in size and distribution. These flakes are a light orange in color, and, being denser than the rest of the wood, stand out from it in marked fashion, lending to the wood a flecked or polka-dot figure which is attractive, dignified, and unique. Lacewood is moderately hard and heavy, works well, and is possessed of a very fair degree of lustre. It is procurable in excellent widths and lengths, sound and uniform, and finishes well.

MACASSAR EBONY is a member of the genus *Diospyrus*, and hence a true ebony. It comes from Macassar in the island of Celebes, Dutch East Indies, where it is also known as coromandel. The texture and grain of this wood are little different from that of "true black ebony," but its distinguishing characteristic is the series of orange and light brown stripes with which the black background is shot through, affording a very effective contrast, and earning for the wood the sobriquet of "golden ebony." In order to obtain the striped effect, the wood must be sawn on the quarter, which, together with slenderness of the trees, generally results in a very narrow veneer. Macassar ebony is also subject to a defect characteristic of the entire true ebony family, a tendency to check. Checking is characteristic not only of ebonies but of most very dense woods, such as satinwood and rosewood. While this is a serious detriment in the eyes of the cabinetmaker, it is often lightly regarded by designers and laymen, who find nothing objectionable in "moderate" checking. Macassar ebony is at its best used as a trimming in connection with lighter colored woods, such as gray harewood and avodire. It has been very effectively used by designers and cabinetmakers for modernistic furniture and interiors.

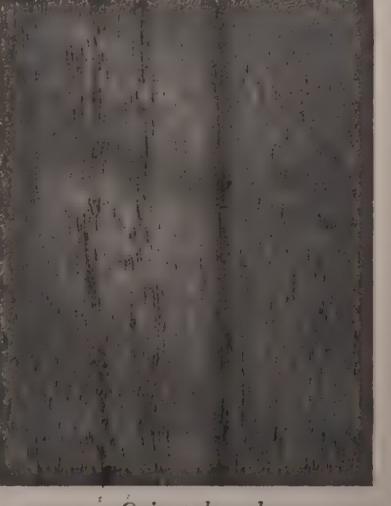
ORIENTALWOOD (*Endiandra palmerstoni*) is probably the most widely used of any of the newer cabinet woods, and it is perhaps on that account that it boasts a more varied nomenclature than almost any other. In addition to the name listed above, this wood is also known, among other titles, as oriental walnut, Australian walnut, Queensland walnut and walnut bean. The tree is native to Queensland, Australia, where it has been widely used for a number of years in cabinet work under the name of walnut bean. Botanically the tree is not a member of the walnut (*Juglans*) family, nor is it even distantly related, being in reality a member of the laurel family, and hence related to imbuia or "Brazilian walnut." It should be noted that the past few years have seen a number of different woods popularly parading under the name of walnut, none of which are actually walnuts, to wit: Brazilian walnut (imbuia), Australian walnut (orientalwood) African walnut (tigerwood) and East Indian walnut (koko wood). Actually, however, the physical characteristics of orientalwood bear marked resemblance to those of French and even American walnut. The increasing scarcity of this latter wood, particularly where richness of figure is desired, is partly responsible for the acclaim which orientalwood has been accorded. It might be remarked, parenthetically, that the reception accorded to orientalwood by manufacturers of American walnut, into whose business it has made great inroads, has been very different. In color and figure this wood is subject to wide variations. Starting with a pinkish colored background, marked by stripes in varying shades of brown, it runs to deep, rich brown, with soft blending gray, pink, and brown stripes. It is generally marked by a broken, mottle, or roe figure, which may be very faint or which may be as strong as a highly figured mottled mahogany. Due to its varicolored stripings, orientalwood resembles French walnut rather more than American, which ordinarily is of a more uniform tone. Orientalwood has an open-pored, close-grained structure similar to that of the genuine walnuts, and works about as well. It is a wood which will continue to be used.



Macassar ebony

Note: All of the illustrations in this article show the wood at actual size; in each case the grain runs with the longer dimension of the rectangle, though in some cases the figure may indicate otherwise

In the July issue Mr. Berman's article will be concluded, carrying through the alphabetical list and including a few of the burls



Orientalwood

Some Pitfalls in Supervision

By W. F. Bartels

XX. DAMPPROOFING

DAMPPROOFING to the average superintendent is a dark (figuratively and literally), misleading subject, beset with dubious possibilities. It can steer no middle course. It is either good or bad. If good it is forgotten and the tenant or owner lives in peace. If bad, it will be a constant source of annoyance to every one and a costly item to correct. If it is not done properly at the outset, the damage will continue, due to falling plaster and redecorating for new tenants.

Dampproofing, however, does not need to hold out a prospect of gloom if the architect and superintendent will spend sufficient time to investigate the subject thoroughly. Dampproofing will be treated here only as to making the wall surfaces moistureproof in themselves. The problem in regard to caulking and spandrel waterproofing will be treated subsequently.

The surfaces to which dampproofing is to be applied should be free from dirt and foreign substances, or it will not adhere. The joints should be well filled up and pointed to the satisfaction of the dampproofer. But the superintendent personally should check this work carefully, for the following reasons. The mason contractor may not leave the interior walls in a workable condition for the dampproofer. The latter, not wishing to be considered a nuisance, may not object very strenuously to this faulty condition of the walls. He may have a little too much faith in the ability of his men to fill the voids which remain, or hope that the material may cover the holes, but on drying out it will contract and leave flaws in the coating. Hence care must be taken to see that a suitable surface is provided for this important coating.

Practically all dampproofing that is applied as a separate substance to the inside of a wall uses asphalt in one form or another as its base. It may be emulsified, or it may be made workable by the addition of napthas or other volatile oils. The use of dead oils must be guarded against in this connection, and their use strictly prohibited. To the base may be added a fiber, limited in amount for the spray type, but greater in quantities when brushed or trowelled.

The asphalt used by various manufacturers differs. Some comes from one country, some from another. Each kind has its proponents and backers, claiming theirs is the best. Only experience with the different types will determine their fitness. In any case they should conform to the U. S. Bureau of Standards requirements for dampproofing asphalt. These give limitations for melting point, penetration, ductility, and solubility. Then, too, it is desirable to obtain one with an enduring, gummy base, which will grip the wall well and allow the plaster to secure a firm bond. Inquiry should be made to ascertain if all the asphalt entering the mastic is of the same grade. When the asphalt is stored and then drawn, unless the tank is equipped with suitable agitators, a different specimen is likely to be obtained at each successive drawing, due to the tendency of the asphalt to settle in layers.

The chief types of applying dampproofing, to keep moisture on the outside of buildings, are the spray, brush, trowel, or variations of these types. The spray coat, which is an emulsion of asphalt, clay and water, is put on cold under pressure. This enables it to penetrate the pores of the masonry, but of course the coat is of necessity rather thin. Any excess spraying will only cause the material to run down to the floor, while if the material is thickened up it will be impracticable to spray it. Moreover, if a heavier pressure is used it would do little good, since it would blow the material off as well as on. These difficulties can be overcome, however, by applying successive coats, thus obtaining a thicker skin over the wall. In fact, it is usually necessary to apply more than one spray coat to get satisfactory results. Some contractors start off with a heavier material and, by heating it, succeed in obtaining satisfactory results with one spray coat.

Another variation of the spray method has been used on several large buildings. It consists of first spraying a cement coat upon the masonry. This fills up all the small holes and

crevices. Then, for the finish, an emulsion of asphalt is sprayed upon the cement coat. The first coat, acting as a blotter, distributes the moisture, and the final coat keeps it from reaching the plaster. Of course it must be realized that in this case there is no hydrostatic pressure to complicate the problem.

Putting on dampproofing by means of a brush is still another method in the fight to keep the elements and moisture on the outside of a building. In this type of application the asphalt is thinned, and a certain amount of asbestos fiber added. The material, of course, must be as heavy as can properly be applied with a brush.

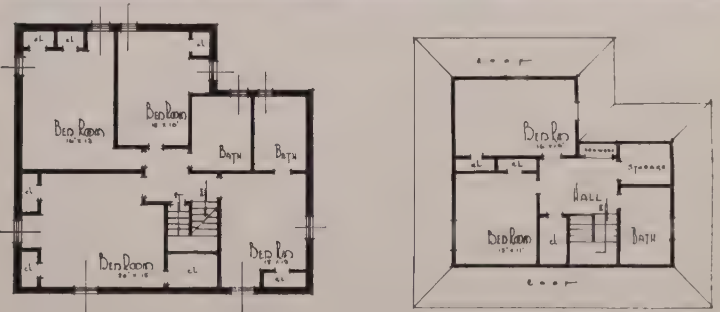
A trowel coat of mastic may appear to be a simple method of dampproofing, as indeed it is insofar as the application is concerned. It must be forced solidly against the surface and well troweled, leaving no vacant spots or holes out of which it may have been pulled. It should be returned on all reveals, and it is a good idea to have it form a border on the ceiling. It should be applied to all chases and recesses before the pipes are installed, because of the difficulty of applying it in these places afterward. The material should be applied from $\frac{1}{16}''$ to $\frac{1}{8}''$ in thickness. It is well to have an agreement as to the number of square feet to be covered by an approved sample. Based on the above figures, the coverage would be 30 to 14 square feet per gallon, depending on the condition of the wall. An attempt to use less than $\frac{1}{16}''$ will cause quick drying and very little substance to which the plaster can attach itself. The use of more than $\frac{1}{8}''$ will cause the material to creep, with resulting disaster to the plastered wall. The superintendent can check the amount being put on by noting the number of barrels arriving on the job and computing his wall area. Dividing the number of gallons in all barrels into the total wall area will result in the number of square feet a gallon has been made to cover.

Mastic, unless it is an emulsion, should not be put on a damp or wet wall. In fact, it is difficult to do it, and the workmen will soon give up the attempt of their own accord if the wall is very damp, because the mastic will not adhere and drops back on them. The improper mixing of material will cause a defect in dampproofing that is not only at once recognizable, but is one that will cause a loss to the contractor. If he purchases the material rather than mixing the ingredients himself, this is likely to occur. The asphalt fiber—which should be a long fiber—is mixed with the oils and asphalt. Then, instead of letting it mix for the required time, the mixer may start to draw it off shortly after starting. Hence the first batch is not well agitated, while the last is well mixed but is not in the proper proportion. When this is applied the first part will be "short" and tend to drop off, while on the last batch a superhuman effort will be necessary to smooth it out. Thus it will be seen that more labor will be involved and the cost of the application increased.

Emulsions are said to have an advantage in that they may be put on damp walls. While this is true, it would be more accurate to state that they *should* be put on damp walls, or else the walls be so sealed that the emulsion does not at once loose its water. With its water content lost at once by suction, the material does not obtain its proper set and cannot form a strong bond with the wall.

The question of whether it is better, or not, to have a film of sand blown on the dampproofing to provide a better bond for the plaster, is often brought up. Some feel that this is an aid, while others, including plasterers, do not deem it a help, and it does increase the cost. Almost every one feels that dampproofing is not to be recommended for ceilings, or for areas where the plaster is largely dependent upon the coating for a bond sufficient to resist gravity. Nor is it good practice to use cement plaster on asphalt; the former, being rather "short" and non-binding, will tend to crumple away from the wall. However, other plasters are satisfactory, such as either lime or gypsum plaster, although some dampproofers prefer a bond plaster applied over their work but are not insistent in this demand.

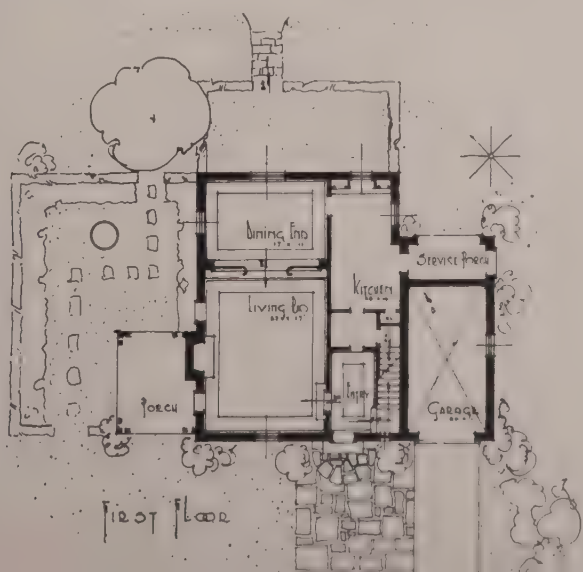
After the dampproofing is applied, it is important to plaster at the right time. Over sprayed dampproofing, plaster should be applied in not less than one day nor more than three weeks; over brush coating, in not less than three days nor more than four weeks; and over trowel coating, not less than five days nor more than five weeks. It should be borne in mind, however, that the maximum time is more or less arbitrary, depending upon the tackiness of the surface.



House of William E. Frenaye, Jr., Llewellyn Park, N. J.

HOWARD & FRENAYE, ARCHITECTS

White plaster, mitis green trim, green slate, verdigris copper porch roof



Photographs by Harold Haliday Costain

House of William J. Yates, Ossining, N. Y.

ROBERT WISEMAN, ARCHITECT

PLAN OF SECOND FLOOR

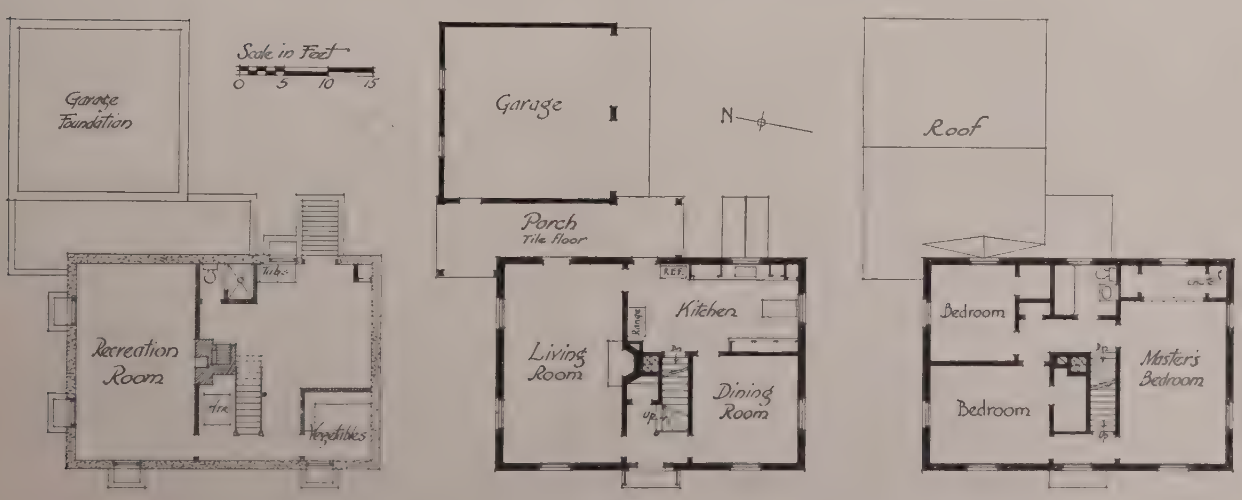
PLAN OF FIRST FLOOR

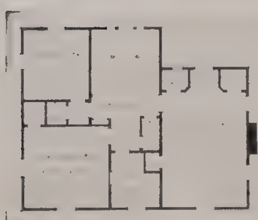
Photograph by John Farnum

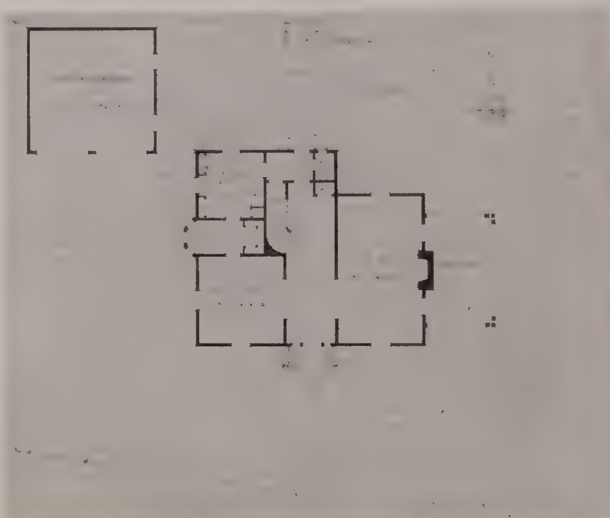
House of Dr. Stanley R. Dixon, Providence, R. I.

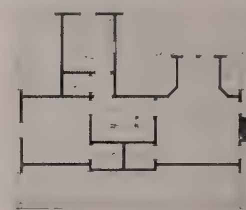
P. M. LARSON, ARCHITECT

The "Springfield (Mass.) Republican" sponsors annual contests to determine the best small house built in that community. This year a jury, with Henry R. Shepley as professional advisor, awarded the first prize for houses costing not more than $10,000 to "Pondsbank," illustrated herewith. The jury also awarded this house a certificate of honor for its excellence without limit of cost





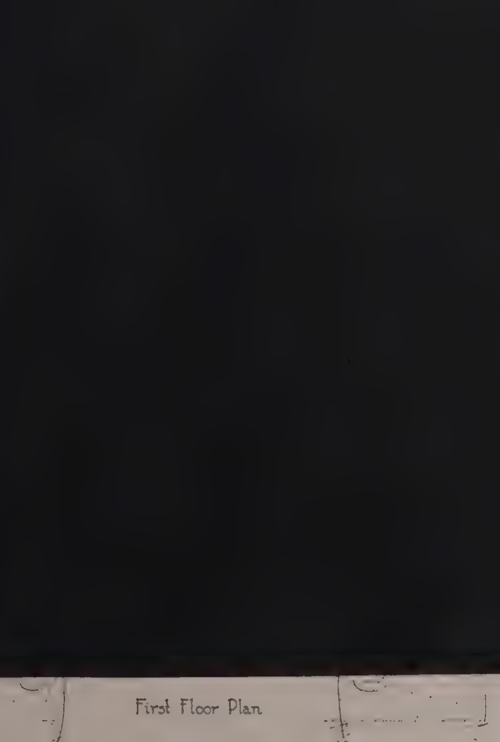




House of
J. Benjamin Nevin,
Providence, R. I.

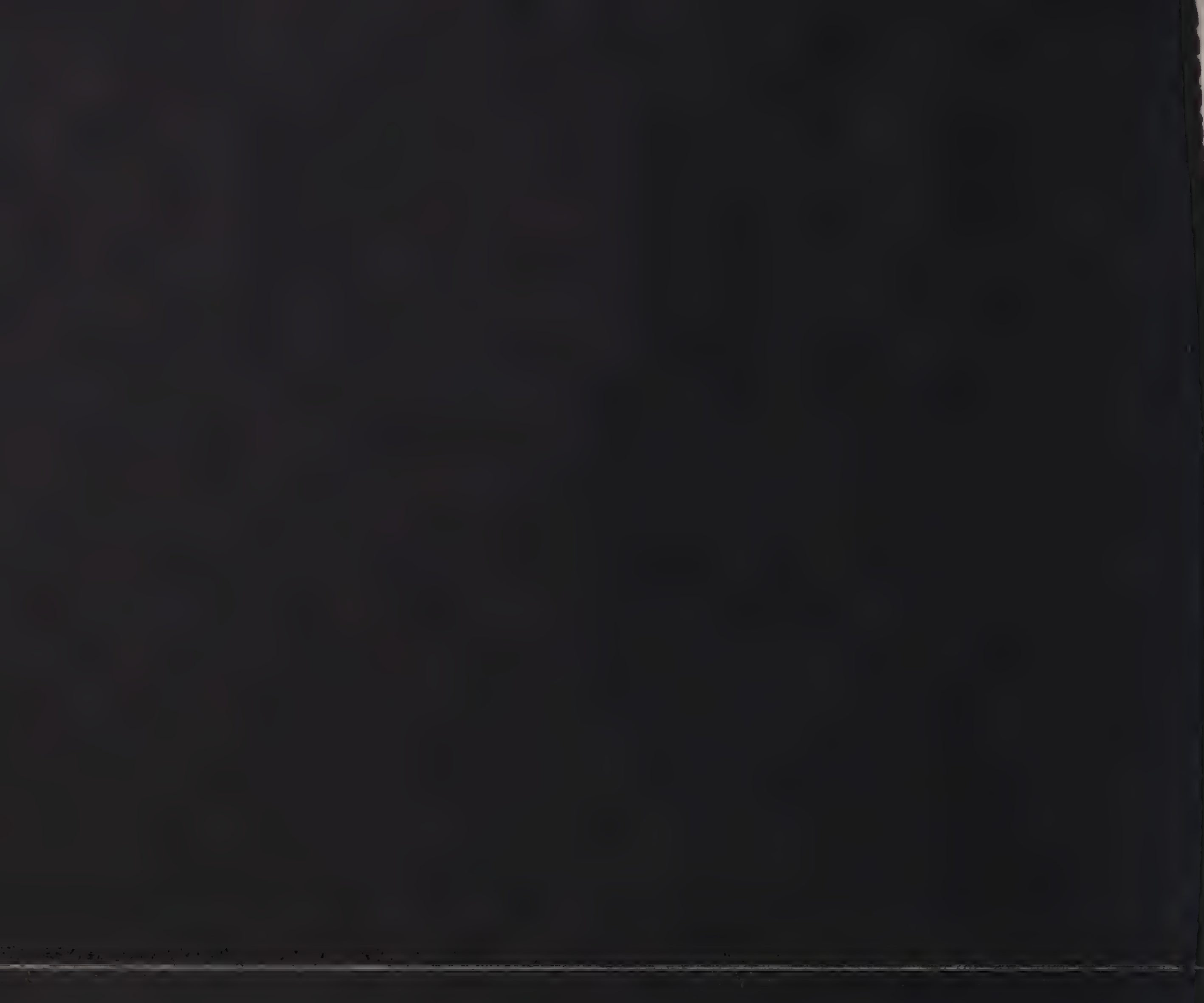
Edwin C. Cull,
Architect

With the co-operation of the Rhode Island Chapter, A. I. A., The Providence Sunday Journal *is illustrating examples of houses in the best taste as selected from this community. One of the first to be shown is the house illustrated herewith*



First Floor Plan

Second Floor Plan



The valleys were broadly rounded

The brick is whitewashed and, in parts, covered by stucco. The timbering, which is structural, is of oak, stained, whitewashed, and wire-brushed after a month or so

One characteristic of the Norman farmhouses is the chattière, *one of which is here seen above the nearer dormer. It is here used for ventilation, but in France it is for the convenience of the cats*

Notice that a smoother brick is used for the quoins, with flush joints excepting those raked to accent the quoin units. The stucco leans very slightly to the cream side of white

Murals
in the Main Lobby of the Buffalo City Hall

PAINTED BY WILLIAM DE LEFTWICH DODGE

ARCHITECTS: DIETEL & WADE AND SULLIVAN
W. JONES ASSOCIATES, INC.

In the murals shown on the following three pages Mr. Dodge has not been content with color on the plane of the canvas. He has modelled certain parts in low relief and has used gilding thereon with the color

Below are shown, at the left, one of the long corridors with "Protection" at the far end, while at the right is the main lobby as seen from the entrance, with one of the Buffalo panels under the arch

Photographs by George A. Ostertag

The central figure representing "Peace" is twice life size and is represented as bringing together the United States and Canada. The ornament about the head and the wheat at the feet of the figure are modelled in low relief, gilded, and painted in color

Photographs by
Peter A. Juley & Son

The central figure, again twice life size, represents "Abundance." This figure and the one in the upper panel are painted in grays to remove them from the actual. Here the helmet, the wheel back of the head, the breastplate, garland of fruit, horn of plenty, and buffaloes at the bottom are modelled, gilded, and painted in color, toned down to an antique effect

Photographs by Peter A. Juley & Son

Photographs by Peter A. Juley & Son

The Editor's Diary

Friday, April 1.—Philip Johnson, who arranged the exhibition of so-called International Architecture at the Museum of Modern Art in New York recently, displays the over-enthusiasm of the protagonist when he says: "Freedom of plan is the principal advantage in the modern style in school architecture. In the older type of school architecture, Georgian, for example, the arrangement of the rooms necessarily had to follow the plan of the outside of the building, and windows had to be placed in definite relation to the exterior design. In the modern style, the windows can be arranged as desired, often across the entire side of the building."

Too frequently the designer has freed himself from one set of bonds only to put himself under others. To gain his unbroken line of outside windows he will carry columns up through a room, fireplace and chimney as well, with no rational relation to his wall surfaces. There is no doubt whatever that Georgian architecture, for example, places restrictions upon our planning, but there seems to be little doubt also that the designer in the so-called International Style accepts restrictions and adopts compromises that are no less harmful to his design. The kernel of the matter seems to be, after all, that each problem in design is an individual one which calls for all the ingenuity and unrestricted ability that the designer can muster. Any sort of a straight-jacket will hamper him—even the necessity, if he accepts it, of making the building beautiful. In a word, there is no easy road to architecture that is worthy of the name.

Monday, April 4.—The growing practice of utilizing bootleg engineering has had a setback. The free "sales engineering" supplied by firms engaged in the manufacture, sale, or installation of construction material is, as we have said before in these columns, worth just what it costs, which is nothing. The United States Government now comes to the rescue with a bulletin issued by the Supervising Architect to all architects engaged on governmental work. It says: "Engineers, both structural and mechanical, should not have any connection, either directly or indirectly, with, nor have any financial interest in any concern providing or handling the products covered by the designs during the period the designs and working drawings were being developed. You are requested to submit a statement that this condition has been complied with at the time the completed tracings and engineering computations are forwarded for approval." If we believe in the status of the architect as one who must have no financial interest in the project other than his relation as professional advisor to the owner—if we believe this, we must believe that the interests of the owner are never best served by turning over any part of the design of a structure to one whose personal interest may obscure his judgment.

Tuesday, April 5.—After several years' work by the architects and engineers of New York State, Governor Roosevelt has signed the bills which place the two professions on a parity so far as licensing laws and recognized qualifications go. Both bills prescribe that building permits may be filed by either licensed architects or licensed professional engineers. Each bill exempts the other profession, so that the licensed professional engineer is not barred legally from the practice of architecture (though he cannot call himself an architect) and licensed architects are not barred legally from the practice of engineering (though they cannot call themselves engineers).

Wednesday, April 6.—Up to Mount Vernon with James H. Hogan and Paul S. Buck to see a memorial window which Hogan designed for execution by James Powell & Sons, Ltd. Mr. Hogan has developed still further here a technic of which the first example in this country is in the reredos of the Chapel of the Beloved Disciple, Church of the Heavenly Rest, designed by him in collaboration with Mayers, Murray & Phillip. The problem in each case was to get somewhat the effect of a stained-glass window where there was no transmitted light. Hogan has done this by using translucent glass set in cement on a slate backing. The glass is painted with glaze in the traditional stained-glass manner, but the glaze is underlaid by gold leaf, silver leaf, or platinum. After the color glaze is laid on and fired, it is etched away with hydrofluoric acid to allow the metallic backing to show through. This etching must stop short of uncovering the metal, so that there will be no danger of oxidation. The result is a technic that results in neither stained glass nor mosaic, yet having something of both. Unlike mosaic, it has the great advantage of permitting modelling, which is painted and fired on the glass. The luminosity and beauty of the underlying gold and platinum is impossible of description, and, I am afraid, of photographic reproduction (see page 322). It is a technic in which Mr. Hogan has already progressed far, and will undoubtedly go still farther.

Thursday, April 7.—Thomas Wilfred, president of the Art Institute of Light, talked to a large and enthusiastic audience to-night at The League on "Lumia: the Eighth Fine Art." It is an art that dates back to some prehistoric caveman who seized a piece of wood from the fire, held it aloft and described a glowing pattern by swinging it in a circle or figure eight. Although light is an essential in every art except music, we have, through the ages, done very little in attempting art expression with light itself. This is what Thomas Wilfred does with his color organ or Clavilux, in which form, motion, and color are the three basic factors, and in which form is never formalized. Mr. Wilfred, unlike some other experimenters with color projection, believes in the efficacy of perfect quiet as a factor in our enjoyment, rather than any attempt to synchronize color projection and music. He has gone far in his experiments and invention, but feels that he is only on the threshhold of what will be done with pure light in the near future.

Friday, April 8.—The pre-convention meeting of the New York Chapter, A. I. A., resolved itself into a long and earnest discussion of two subjects: the proposals for unification of the architectural profession, and the Architects' Small House Service Bureau. In connection with the first subject, a long debate finally resulted in an expression of the sense of the meeting that the New York Chapter favors the present efforts toward unification, with the preference for some scheme by which the state organizations should not become members of the Institute itself. In other words, the choice was for some form of affiliation rather than corporate membership.

In the matter of the Small House Service Bureau, little was known about its workings, a lack but for which the present debate would hardly have arisen. With the aims, ideals, and procedure of the Bureau clearly in mind, the Chapter voted favoring a continuation of the A. I. A.'s endorsement of the Bureau, but with the suggestion that the Bureau's services should be rendered through architects and architects only. In a word, the Bureau's services are an extension of the architect's services into the lower scale. These services should not be sold to the public as merchandise, but rendered to the public by members of the profession itself.

Tuesday, April 12.—Dropped in at the American Russian Institute, where Hector O. Hamilton, winner of the first prize for the Palace of the Soviets, was being given a farewell reception preceding his departure for Russia. Hamilton told us something of his scheme, which is to house some forty-five thousand people, thereby creating a somewhat startling traffic problem. He solved it by having his whole ground floor a traffic entrance—tramcars, busses, and private automobiles drive in under the huge building to discharge their passengers. At one end is what corresponds to our House of Representatives; at the other, what corresponds to our Senate, and in the middle the great library and office building. Hamilton, I believe, will be in Russia only long enough to study the site and make contacts with his Russian collaborators, after which he returns to America to make his working drawings with the help of American engineers.

Wednesday, April 13.—This afternoon found a large group of men and women brought together for a conference on large-scale operations as a solution of the housing problem. Robert D. Kohn pointed out the fact that we have in the past been doing too much along the lines of exploiting the city-beautiful idea at the expense of rational planning and financing. He pointed out that one of our best-known housing developments of some years ago was started ostensibly for workmen, and ended by being occupied by bankers, most of whom had to carry second mortgages on their houses. Mr. Kohn took a shot at the so-called International Style by saying: "Piling up a series of concrete and glass filing-cabinets one above the other is not a solution of urban housing." Mr. Kohn also made it clear that he is numbered among the growing ranks of those who agree that the own-your-own-home propaganda was a step in the wrong direction.

Andrew J. Eken, vice-president of Starrett Brothers & Eken, Inc., builders of the Empire State Building, Bank of Manhattan Building, and other commercial milestones, expressed the opinion that before we solve the problem of large-scale operations, we have got to find better and cheaper ways of building. Although we have made great progress in the methods by which we build our large structures, Mr. Eken feels that we are only at the beginning of a period of simplification and standardization which will vastly increase our productivity as builders.

The conference separated to gather again at dinner, when William Sloane Coffin, the new president of the Metropolitan Museum of Art, presided in the Empire State Club. The evening was given over to a discussion of financing large-scale housing operations. Orrin C. Lester, of the Bowery Savings Bank, spoke on the problems of the lower east side of Manhattan. Willard I. Hamilton, of the Prudential Life Insurance Company, told of the company's housing operations in Newark, where, in the development of one city block upon which the buildings occupied about one-third of the land, families with an average income of $45 weekly are housed in fireproof, walk-up apartments at $10 to $14 per room per month. Paul Blanshard pointed out that none of the housing efforts thus far launched in this country provided for people in the lowest-third income group, nor is it likely, with the present outlook, that any commercial project can reach them. Even our City Housing Corporation efforts, with a limited dividend, have given us houses averaging a rental of $12.50 per room per month in Manhattan, whereas to meet the needs of the lowest economic third, housing must rent for not more than $7.50 per room per month. Mr. Blanshard's argument is that to provide this low-cost housing it is obvious that we should take advantage of the fact that our collective credit as a nation enables us to borrow money at a lower rate than under the credit of any individual or any smaller group. He urges the issuing of bonds by the Government, the money being loaned to the States, and by them to municipalities for large-scale group housing. Charles F. Lewis, director of the Buhl Foundation, Pittsburgh, was unavoidably absent, but sent a message through Henry Wright, who told of the comprehensive and carefully studied effort made in Pittsburgh for the housing of individuals in the white-collar class. Here, as in so many of our efforts, the houses have been occupied by a higher-income group than was anticipated. It is particularly interesting to know that the investigators who were advising the Foundation as to this project, expected to advise that individual houses for sale would be the best procedure; as a matter of fact, their research showed that row housing for rent was the better method. These "rows," of course, are so far in design from the "rows" we know in Philadelphia and Baltimore, for example, as to be entitled to an entirely new classification name.

Friday, April 15.—Lunched with Andrew Eken, the builder, during which I had the opportunity of drawing him out further in regard to large-scale housing possibilities. Mr. Eken is convinced that the present lull in our building activities is a splendid time in which to set our house in order and improve our technic. One has only to stand by the rubbish chute of a building under construction to realize that our technic leaves much to be desired. We pay for hauling valuable materials to the job, pay men to cut them up and set them, producing an amount of waste that is appalling—and then pay to haul it away. Obviously, a far more widespread application of standardization, cutting down field work, is our next step forward.

Tuesday, April 19.—Another one-man show opened in The League Exhibition Room to-day, the work of Ely Jacques Kahn. There is a startling contrast between the traditional country houses that Kahn did on his return from Paris, and the office buildings which he has been able to scatter with such a free hand over the island of Manhattan during the past few years. It is a marvellously fecund and stimulating exhibition.

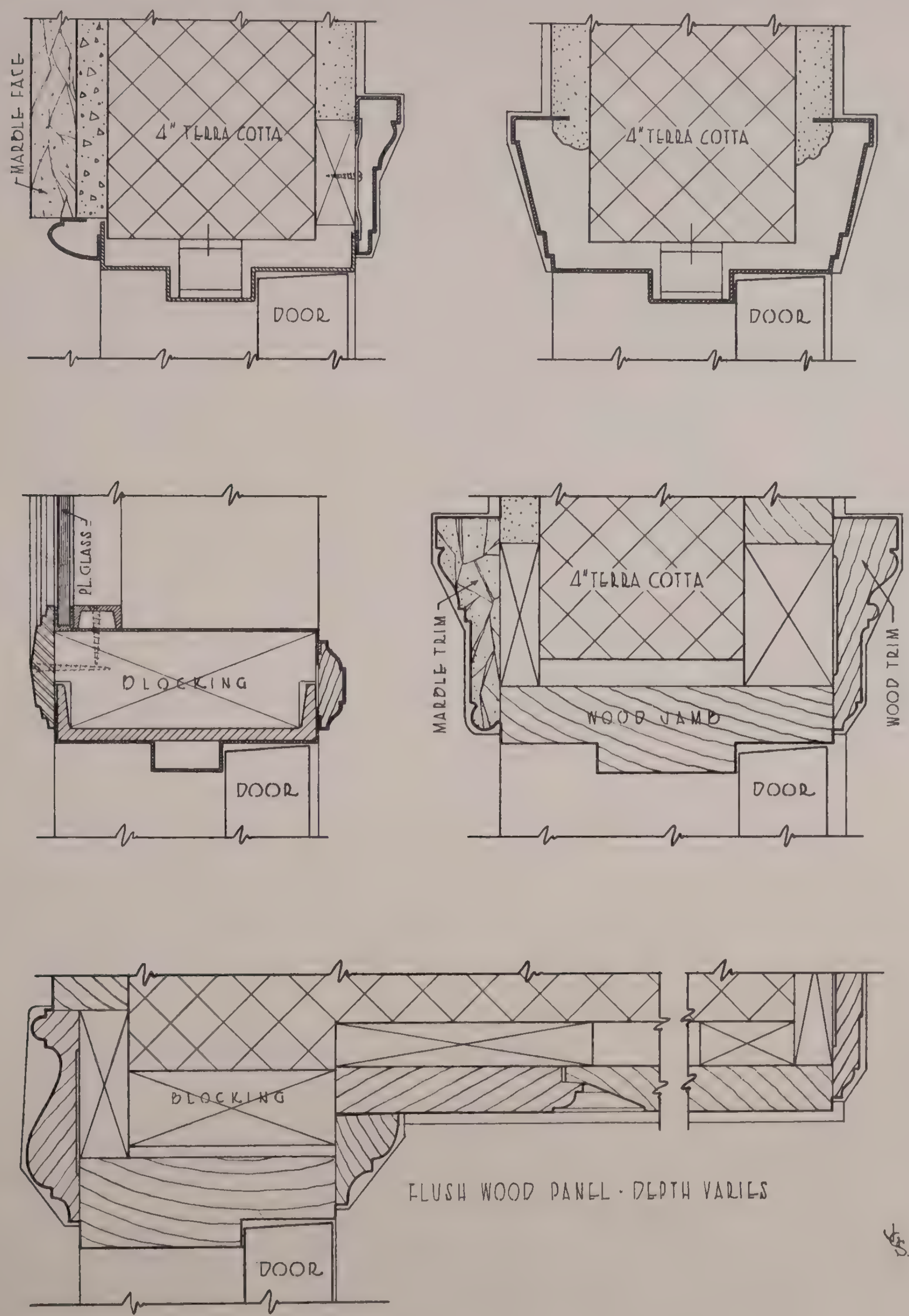
Thursday, April 21. — Reinforced brick masonry is taking its place beside reinforced concrete masonry in the category of modern methods of practice. Hugo Filippi, of the Western Society of Engineers, told us, with slides and motion pictures, of this development at The League tonight. Mr. Bryan Warman put on for us the sound motion picture showing the process of making drawn window glass, plate glass, and shatter-proof glass in the Libbey-Owens-Ford Company's plants—a most interesting picture, skilfully made.

Sat with Harold Rambush at the dinner to-night, and he told me of the curious complications arising from the explosion in the Ohio State office building. Rambush, who had a decorating contract with the State, had almost finished the work he was to do. The explosion wrecked it. The State of Ohio now instructs Rambush, and others doing other branches of the work, to complete their work anew without extra remuneration. The point on which the State bases its case is a little sentence in the A. I. A. General Conditions, saying: "The contractor shall continuously maintain adequate protection of all his work from damage and shall protect the owner's property from injury or loss arising in connection with this contract." The contractors would be covered by their insurance if it were possible to determine the cause of the explosion, which still remains a mystery. There are signs of a long legal battle ahead on this point.

Friday, April 22.—Lunched with Greville Rickard, to whose office we returned to look over his drawings made in Spain last year. Most of them are in pen and ink, some in pencil, a few in water-color, but many in color pencil which, in Rickard's hands, becomes a distinct medium of unusual delicacy.

Saturday, April 23.—Joseph H. Freedlander has the job of making the temporary reproduction for Bryant Park,

(*Continued on page 352*)



· VARIOUS · INTERIOR · DOOR · JAMB · DETAILS ·

A SERIES OF WORKING DRAWINGS BY JACK G. STEWART

· SCALE : 0 1" 2" 3"

· PLATE Nº 25 ·

back of the New York Public Library, of the Federal Hall in which George Washington first took his oath of office as President. He is putting a cupola on the building, which at once started an argument. There are those who say that the original building had no such crowning feature. There are, of course, no drawings available of the original building. Freedlander has had to work from old prints which, of course, are notoriously imaginative in detail. There are those who contend that what appears to be a cupola on Federal Hall in some of these prints is, in reality, upon a building behind it. However, Mr. Freedlander is convinced that he is right, and the present reproduction which is, in reality, only the front part of the building, built at the original scale, will have a cupola.

Monday, April 25.—Kenneth Murchison is busily engaged these days in arranging for the George Washington Centenary celebration. He was telling me to-day about some of the multitudinous details that have to be arranged. The coach, for instance, in which he, as George Washington, will drive up through Manhattan to Fraunces's Tavern, where he bids farewell to his officers, driving later to the reproduction of the Federal Hall back of the Library, is brought over from Philadelphia, where Clarence Zantzinger unearthed it. The horses, which must be a matched four, are brought by van from Newburyport, Mass. Whether they are accustomed to travelling with a band behind them and in front of them remains to be seen.

With Fred Hirons to Ezra Winter's studio to see his quarter-scale murals for the Clark Memorial in Vincennes. There are six panels extending around the interior of the circular building, depicting important events in the life of Clark and the winning of the West.

Tuesday, April 26.—To Washington for the Sixty-fifth Convention of the American Institute of Architects. It is surprising how unlike his famous professional self an architect appears when encountered shaving in the sleeper washroom.

Wednesday, April 27. — The Mayflower lobby is full of familiar faces—it is curious how consistently the chapters elect the same delegates year after year.

The morning session is given over to an excellent address by President Kohn and short speeches by past-presidents Pond, Waid, and Hammond. Hobart Upjohn read the minutes of the first meeting of the A. I. A., as written by his grandfather, Richard Upjohn, first president of the Institute.

The convention had expected to see, or at least to have a message from, Glenn Brown, secretary of The Institute from 1899 to 1913. The message reached us, but Glenn Brown had died in the hospital last Friday. His contribution to the A. I. A. was so great that we of this generation can scarcely hope to appreciate its full significance.

In the afternoon session the subject of the "Economics of Site Planning and Housing" was threshed out under the able chairmanship of Frederick Bigger.

Several of us broke away at six o'clock, took a taxi to the Lincoln Memorial, and feasted our eyes upon it and the Washington Monument as seen across the lagoon.

To-night, under the chairmanship of Ernest J. Russell, we listened to brief papers on present architectural practice, particularly with regard to the problems of the smaller practitioner.

Thursday, April 28.—The routine work of running through the report of the Board of Directors, voting aye to its carefully framed resolutions, went swiftly on. It is becoming quite evident that, even with all the preliminary work done by the committees and the board, a three-day period is not sufficient time for these conventions.

At luncheon we met with The Producers' Council and heard Mr. Paul Mazur, a banker, tell us what is wrong with the present economic system.

Unification of the profession was debated strenuously throughout the afternoon, the New York State chapters opposing the committee's recommendations in that they wanted to grant no form of membership in The Institute to the state associations. The convention split on this basic point, a majority favoring the committee's recommendations, but not the two-thirds majority required to change the by-laws. Finally the question was put in the hands of two members from either side, Bergstrom and Mayers of California for the committee's recommendations, Voorhees of New York and Williams of New Jersey for the opposition, with instructions to attempt to reach a common ground for achieving unification of the profession.

In the short time that remained before dinner, Electus Litchfield, Ralph Walker, James Betelle, Earl Reed, and I drove up to see the Folger Shakespeare Library which, being closed, gave us only Cret's refreshing exterior details to examine and enjoy.

Charles Butler presided over the evening session as chairman of the Committee on Education, introducing Fiske Kimball, of Philadelphia, who read one of the most convincing and admirably framed opinions of the present situation with regard to architectural style that most of us had ever had the pleasure of hearing.

Friday, April 29.—Early this morning Lorimer Rich, Hubert Ripley, Kenneth Reid, and I dashed over to see Rich's recently unveiled Tomb of the Unknown Soldier, and discussed the obvious necessity of putting some sort of slender barrier of bronze uprights and chain about it. Forty thousand people visited the tomb on last Sunday. Unfortunately, crowds of that size cannot be adequately controlled without some sort of barrier to prevent the damage made by an accumulation of hands laid upon the white Colorado marble.

In the morning, under Vice-President Horace W. Peaslee, other professional and civic organizations met with us to discuss the activities in the national capital and how these might be most effectively safeguarded. At the end of the session Frank Voorhees presented the report of the night-working committee on unification, a compromise on the basis of state's rights that met the unanimous approval of the convention. What had seemed to be a subject on which no agreement could possibly be reached was made the occasion of a love feast.

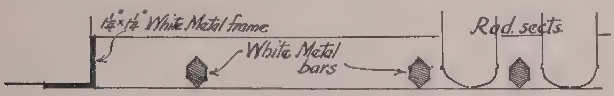
Another between-sessions expedition found Ripley, Rich, LeBoutillier, Reid, and myself in a taxi dashing for a glimpse of the new Japanese Embassy, by Delano & Aldrich; Sir Edwin Lutyen's British Embassy, in which the skilful treatment of brickwork in two colors and surfaces fascinated all of us; then on for a quick glimpse of the Cathedral and the nearby bishop's garden.

The afternoon session was given over to a discussion of the Small House Service Bureau and its endorsement by The Institute. Here again the convention was rather sharply divided, the majority favoring withdrawal of the endorsement unless it were continued on some more satisfactory basis, such as Mr. Litchfield's suggestion that this service be rendered only to and through qualified architects. It was finally necessary to appoint a joint committee, consisting of two members from either side, with instructions through them to report, if possible, a common ground of agreement on which the board was enpowered to take action.

Carl Beck, Litchfield, Dwight James Baum, and I went out to see Murphy & Olmsted's Church of the Sacred Heart, in which James Early has so successfully developed a new form of craftsmanship in plastic mosaic—the use of fine aggregates in color on the face of a poured wall. Just how he accomplished these remarkable effects, some of them with raised ornament, would be interesting to learn.

Back to the hotel for the banquet celebrating the seventy-fifth anniversary, at which I. K. Pond, born within a few days of The Institute's founding, seventy-five years ago, gave us an encouraging, if somewhat sardonic, sketch of The Institute's history. A final buzz of hurried farewells, hasty packing, and a rush for the midnight train back to New York.

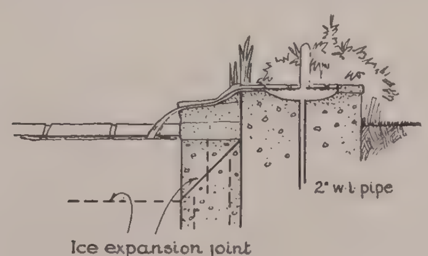
THE grille manufacturers have been spending much of their energies of late in devising efficient and pleasing radiator enclosures, many of which, as the architect knows only too well, are too sparing in their open areas. Here is a

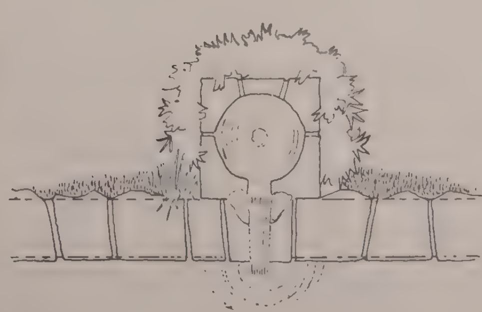


HORIZONTAL SECTION thro' ENDS of GRILLE

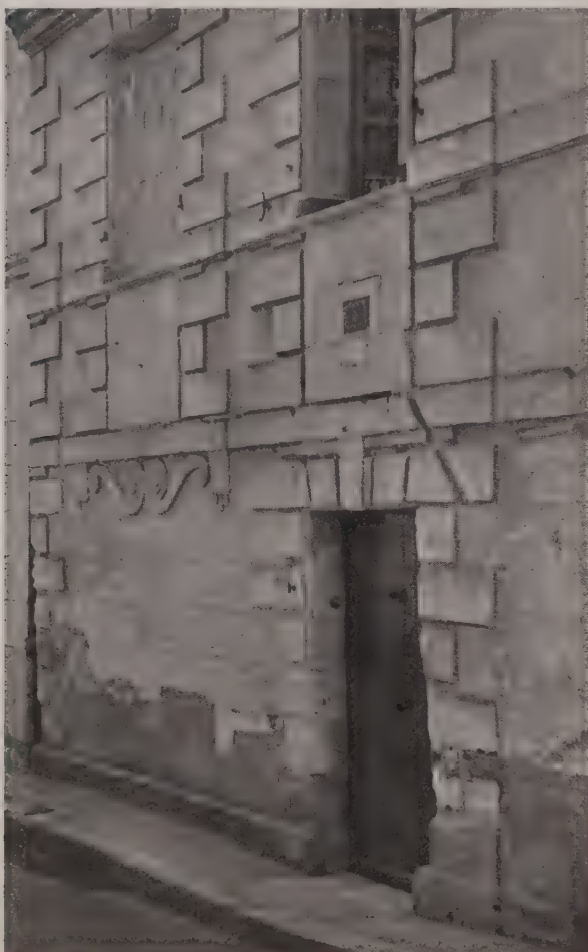
grille devised by John Mead Howells and Raymond Hood, in association, for a New York City apartment-house lobby. Even with a background painted dead black, and with the gleam of white-metal bars fitting between the sections on the front plane, the radiator connections and valve are rather strongly in evidence.

A GARDEN pool seems to us successful in the inverse ratio with the amount of inside coping permitted above the water-line. Here is one on the estate of Charles P. Stokes, Narbeth, Pa., in which Walter H. Sheffield, landscape architect, has kept his water-line up to the surrounding lawn, with a minimum coping height. Moreover, he has made a feature of his water source instead of stopping with a bare iron pipe. There is no scum gutter, the surface being skimmed periodically by flooding. The decorative value of the pool is retained throughout the year, an expansion joint making unnecessary the winter draining customary in this climate.





WHEN the architect built this cream stone house at Amboise he was doubtless considered a bit ahead of his time. At the left, for example, there was no first-floor window to re-



quire quoins, and rather than use them needlessly on a plain wall, he neatly terminated them by a console. Time and again in our modern usage of quoins under such a circumstance they would be excused by a panel balancing the door. But compared to this solution it would be less arresting design and more extravagant stonework. As a result the door in this house has no competing motif to steal the spotlight.

Another modern problem here solved with ingenuity is that of window spandrels. A more prosaic procedure would have been to create a panel back of the wall surface plane, whereas to carry out the spandrel on the face of the quoin loses no emphasis (the shadow in the vertical channel lining up with the window jambs is all the deeper), and in modern construction it would permit more of a radiator recess.

A pleasant refinement is that of the second-floor sill course, where the bottom offset not only has a cavetto profile, but the first quoin below it is reduced in height to act as an uncut row of gutæ. (To the right of the door head-jamb there is a diagonal chase which unfortunately was cut at some subsequent date.)

WE have a feeling that the architect who designed this house at Orléans must have been a model of neatness—witness this solution of folding back shutters into an appointed offset. This is almost as good as the disappearing ironing-board. Having awarded this unknown designer all the palms we can think of at the moment, we would go even farther and commend

his modernity in dispelling pilaster capitals, in designing shutters which are strictly horizontal at the top and then vertical for the greater length of their careers, and in creating a window composition which has significance as well as form—yet was built before the term "significant form" was invented.

Year-Round Air Conditioning in the Home: I

IT is impossible to discuss any subject intelligently without first having a clear definition of the topic; therefore for the purpose of this discussion let us assume that complete indoor air conditioning comprises the following factors:

1. Constant forced circulation to avoid stagnation, stratification, and concentration of bad odors.
2. Continuous air purification to remove dust and other organic impurities as well as unpleasant odors.
3. Heating when heat is needed.
4. Evaporation of sufficient moisture to maintain the correct humidity during the heating season.
5. Cooling on torrid summer days to the extent of actually lowering the temperature approximately 10° F.
6. Dehumidification or removal of excess moisture on summer days when the humidity is too high for comfort.

The public does not yet fully realize that air is the most important element in man's existence—if it did, the demand for air-conditioning equipment would overtax the production facilities of manufacturers. We obtain approximately 60 per cent of our energy and sustenance from the air we breathe and about 40 per cent from food. It is said that a man can live forty days without food and three or four days without water, but only a few minutes without air. He fills his lungs with it approximately 24,000 times per day and consumes more air, either by weight or by volume, than he does of food and liquid.

Let us now consider the six factors enumerated, starting with the first which may be briefly termed "Air Motion." One may experience extreme discomfort on a sultry summer day when the air is motionless. Then a slight breeze stirs the leaves. There is no change in temperature

By W. D. Jordan

President, Air-Control Systems, Inc.

Mr. Jordan's article as here printed is abridged from a paper presented at the Air Conditioning Conference held last March in Cleveland, Ohio, under the sponsorship of the Cleveland Engineering Society and the Case School of Applied Science.—EDITOR.

and no change in relative humidity but a great change in human comfort. Why? Because air motion produces a cooling effect although it does not lower the temperature.

What rate of air movement is required? The groups who have studied the subject are not entirely in agreement on this point, although a rate of 20 to 30 linear feet per minute has been suggested. It would hardly be possible or practicable to establish a fixed standard to apply in all cases since the requirements vary greatly. A theatre may have one occupant per 6 or 7 sq. ft. floor space, a general office may have one occupant per 100 sq. ft. floor space, and a residence one occupant per 500 sq. ft. floor space. Obviously a much larger volume of air per square foot floor space must be moved in the theater than in the home to avoid concentration of odors and a feeling of stuffiness and discomfort.

The suggested rate of 30 linear feet per minute may be practicable in an auditorium but it is neither practicable nor necessary in a residence.

Perhaps it would be better to consider the matter of air motion from the standpoint of the volume of air moved rather than movement in linear feet per minute, keeping in mind that the rate must never be high enough to create a draft. There is considerable difference in opinion as to the volume of air to be supplied to and removed from the room for each occupant. Some believe that the volume should be 30 c. f. m. per person while others will argue that 10 c. f. m. per person is sufficient. A compromise between the two extremes, or 20 c. f. m. per person, seems to be satisfactory under normal conditions in a home or office.

In the average home it is safe to figure twelve persons as being the maximum number likely to occupy the living-room at one time. To supply 20 c. f. m. per person will require 240 c. f. m., and this should prove satisfactory from the standpoint of air motion.

The other rooms of the house are not so important. The dining-room may be occupied a half hour in the morning and again for an hour in the evening. The bedrooms are occupied only at night and the majority of persons still insist upon sleeping with open windows. When people finally accept the fact that with proper air conditioning it is possible to create a better and more healthful atmosphere for sleeping by keeping the windows closed, it will be necessary to provide air movement in the sleeping quarters. However, the volume required will be slight, as the average bedroom does not have more than one or two occupants.

The second of the six factors, "Continuous air purification," is highly important from the standpoint of health. The American public spends millions of dollars per year to obtain filtered drinking water, pasteurized milk, government-inspected meats, and otherwise to insure the quality of its food supply. However, until recently nothing has been done to insure the purity and quality of indoor air, although man's ingenuity has created many devices which pollute and contaminate it.

Outdoor air in cities is never clean and pure except just after a rain. At all other times it is contaminated with smoke, soot, and gases from heating and power plant chimneys, locomotives, automobiles, and with

dust from streets and industrial processes. Outdoor city or suburban air is not "fresh air" nor "pure air." It is so contaminated by smoke alone in our major cities that gardens and grass suffer for lack of the chemical rays of sunlight that support plant growth—these rays being largely filtered out by the smoke screen.

How shall we supply each occupant of a home or office with 20 c. f. m. of clean, pure air? There are two schools of thought on this subject. One favors introducing outdoor air through filters and the other favors recirculating, washing, and purifying the indoor air. During the winter season, the normal infiltration of outdoor air, which is estimated to be about one complete change per hour in a well-constructed building, is sufficient to provide a much greater volume of outdoor air per occupant than is required to replace the oxygen consumed and to avoid an excess of carbon dioxide. The introduction of any additional outdoor air becomes an extravagance from the standpoint of the cost of heating; therefore it appears that the problem to be met is to circulate and purify the indoor air by some process which will not only remove body odors and other impurities originated within the space, but will also remove the dust, soot, and other impurities which are carried into the home or office with the infiltering air.

Air washing is a satisfactory and effective means of air purification. An air conditioner which circulates the air through a very dense spray or artificial rain is imitating nature's method of air purification. However, the density of the spray in an air washer is an all-important factor; the spray chamber must be completely filled with a water curtain or mist of sufficient density to prevent impurities from passing through the chamber without contact with the water. If the atomization of the water is in the form of coarse drops, a comparatively large quantity of water must be used to completely fill the spray chamber. On the other hand, if the water is very finely atomized it is possible to obtain sufficient density in the spray chamber with a small volume of water. One type of atomization may require one pound of water to each three pounds of air circulated, while another type of atomizer producing a very fine spray may give equally good results with one pound of water to ten or twelve pounds of air circulated. It appears that one pound water to 140 cu. ft. air is the absolute minimum to properly wash and cleanse the air.

The third of the six factors, "Heating," requires no comment from the standpoint of its necessity in relation to human comfort. However, an air-conditioning unit which evaporated sufficient moisture to maintain the correct humidity requires heating as an integral part of the unit to provide the heat necessary for evaporation.

A well-constructed residence of eight rooms containing 25,000 cu. ft. of space, with one complete air change per hour in severely cold weather, will require the evaporation of sufficient moisture to humidify the 25,000 cu. ft. per hour of infiltering air. Assuming an outdoor temperature of 15° F. and a relative humidity of 50 per cent, the infiltering air will carry ½ gr. of moisture per cu. ft. Heated to 70° F., the requirement is 3.2 gr. per cu. ft. to maintain an indoor relative humidity of 40 per cent. The difference between ½ gr. and 3.2 gr. must be evaporated, which is calculated as follows:

$$\frac{25{,}000 \times 2.7}{7{,}000} = 9.6 \text{ lbs. per hour}$$

The actual requirement will be somewhat less, due to the moisture from cooking processes and from the occupants; therefore it is safe to assume that not more than 8 lbs. per hour will be required. Since it requires 1,050 B. t. u. to evaporate 1 lb. of water from 70° F., the total heat required to evaporate 8 lbs. water per hour is 8 × 1,050 B. t. u., or 8,400 B. t. u. This heat may be supplied by pre-heating the air or by heating the spray water or by a combination of the two methods. Where a comparatively small volume of spray water is used it would hardly be practicable to add the 8,400 B. t. u. to the spray water; therefore it seems advisable to supply at least a considerable part of the heat needed in the form of pre-heating the air. The requirement to keep in mind is that the air conditioner must supply enough heat to have at least 8,400 B. t. u. per hour available for evaporation.

The fourth factor, "Humidification," is vitally important from the standpoint of health and comfort. Colds and other respiratory ailments are commonly classed as "winter illnesses" because they are most prevalent during the heating season. Physicians and health authorities agree that heated, impure, desert-dry air is largely responsible.

Most health authorities agree that a relative humidity of 40 to 50 per cent is entirely satisfactory.

However, another factor which must be given consideration is the condensation of moisture on windows. With an outdoor temperature of 15° F. and indoor relative humidity of 40 per cent, a considerable amount of condensation will occur on single glass windows, as the air coming in contact with the glass surface will be cooled below the dew-point.

Double glazing or double sash will avoid the problem of excessive condensation. Considerable difficulty has been experienced with double glazing in single sash, due to the accumulation of dust and moisture between the panes of glass. One enterprising glass concern is now producing window-panes to order in any size, comprising two sheets of glass separated by 1/16 in., ⅛ in., or thicker spacer strips at the edges, so cemented as to be air and dust tight, and requiring only slightly deeper rabbetting of the sash. This construction would not only make it possible to maintain correct humidity indoors without excessive condensation but would also materially cut down the heat loss through the exposed glass surface.

The user of air-conditioning equipment has three alternatives—he may use double windows to avoid condensation, he may regulate the air-conditioning equipment to maintain a comparatively low relative humidity in severely cold weather, or he may maintain the correct humidity and accept the condensation. Dry windows in severely cold weather are a sure sign of unhealthfully dry air.

Mr. Jordan's article is concluded next month with a discussion of Cooling and Dehumidification.

1926
DORMER WINDOWS
SHUTTERS AND BLINDS

1927
ENGLISH PANELLING
GEORGIAN STAIRWAYS
STONE MASONRY TEXTURES
ENGLISH CHIMNEYS
FANLIGHTS AND OVERDOORS
TEXTURES OF BRICKWORK
IRON RAILINGS
DOOR HARDWARE
PALLADIAN MOTIVES
GABLE ENDS
COLONIAL TOP-RAILINGS
CIRCULAR AND OVAL WINDOWS

1928
BUILT-IN BOOKCASES
CHIMNEY TOPS
DOOR HOODS
BAY WINDOWS
CUPOLAS
GARDEN GATES
STAIR ENDS
BALCONIES
GARDEN WALLS
ARCADES
PLASTER CEILINGS
CORNICES OF WOOD

1929
DOORWAY LIGHTING
ENGLISH FIREPLACES
GATE-POST TOPS
GARDEN STEPS
RAIN LEADER HEADS
GARDEN POOLS
QUOINS
INTERIOR PAVING
BELT COURSES
KEYSTONES
AIDS TO FENESTRATION
BALUSTRADES

1930
SPANDRELS
CHANCEL FURNITURE
BUSINESS BUILDING ENTRANCES
GARDEN SHELTERS
ELEVATOR DOORS
ENTRANCE PORCHES
PATIOS
TREILLAGE
FLAGPOLE HOLDERS
CASEMENT WINDOWS
FENCES OF WOOD
GOTHIC DOORWAYS

1931
BANKING-ROOM CHECK DESKS
SECOND-STORY PORCHES
TOWER CLOCKS
ALTARS
GARAGE DOORS
MAIL-CHUTE BOXES
WEATHER-VANES
BANK ENTRANCES
URNS
WINDOW GRILLES
CHINA CUPBOARDS
PARAPETS

1932
RADIATOR ENCLOSURES
INTERIOR CLOCKS
OUTSIDE STAIRWAYS
LEADED GLASS MEDALLIONS
EXTERIOR DOORS OF WOOD

THE SIXTY-EIGHTH IN A SERIES OF COLLECTIONS OF PHOTOGRAPHS ILLUSTRATING VARIOUS MINOR ARCHITECTURAL DETAILS

ARCHITECTURE'S PORTFOLIO OF

METAL FENCES

Subjects of Previous Portfolios Are Listed at Left

Forthcoming Portfolios will be devoted to the following subjects: Hanging Signs (July), Wood Ceilings (August), Marquises (September), Wall Sheathing (October), French Stonework (November), and Over-mantel Treatments (December). Photographs showing interesting examples under any of these headings will be welcomed by the Editor, though it should be noted that these respective issues are made up about six weeks in advance of publication date.

Sterner & Wolfe

For a Long Island estate

Allen & Collens

Santa Monica, Calif.

Charles A. Platt

Harrison Gill; Paul Fjeldi

University of Coimbra, Portugal

S. H. Lourdon

Robert D. Kohn, Charles Butler, Clarence S. Stein; Mayers, Murray & Phillip, consulting

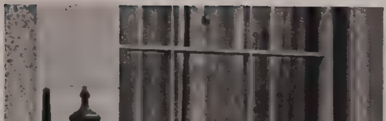
Leigh French, Jr.; H. D. Eberlein associated

William Christensen Company, Inc.

Eric J. Reeves

Annette Hoyt Flanders

William Pitkin, Jr., & Seward H. Mott



Mott B. Schmidt

Office of John Russell Pope

Clifton, Gloucestershire, c. 1825

Frederick J. Sterner

In Salem, Mass.

In Washington Square, New York City

Frederick J. Sterner

Chipping Campden, Gloucestershire

Stony Stratford, Northants; late seventeenth century

Cheltenham, Gloucestershire

A New York City residence

F. G. Dempwolf

Old Almshouse, York, England

J. A. Dempwolf

John B. Snook, Inc.

McKim, Mead & White

Cass Gilbert

St. Peter's Church, Philadelphia

Maynicke & Franke

Dwight James Baum

Arnold W. Brunner

About a park, Varese, Italy

Cameron Clark

Chipping Campden, Gloucestershire

Guilbert & Betelle

About a public garden, France

On Fifth Avenue, New York City

Charles D. Lay

Carrère & Hastings

Charles D. Lay

Charles D. Lay

Cross & Cross

New York City

Charles B. Meyers; Thompson, Holmes & Converse

Villa Albani, Rome

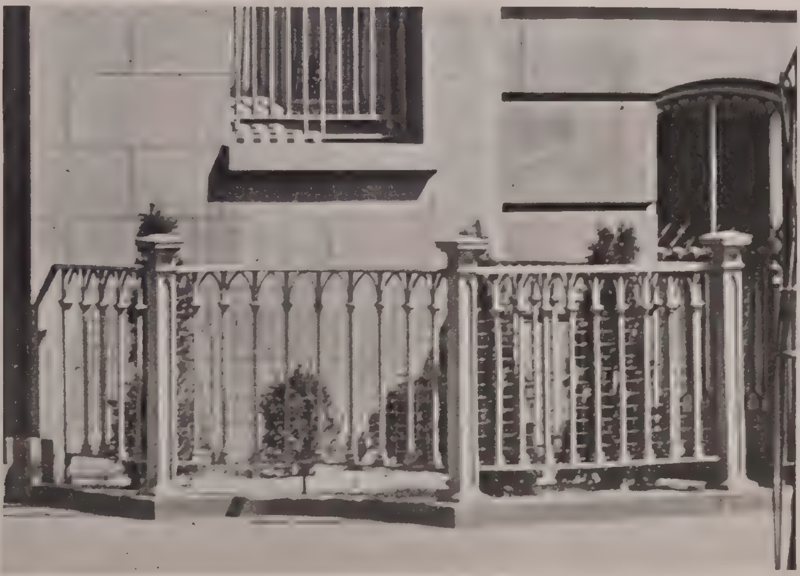
Wallace Neff

Old St. John's Church, Philadelphia

Middle of Park Avenue, New York City

Lawrence Peck

Carrère & Hastings



Carnegie House, New York

Broadway, Worcestershire

George Bartlett

Clifton, Gloucestershire, c. 1820

Villa Cicogna, Bisuschio, Italy

Cheltenham, Gloucestershire, c. 1828